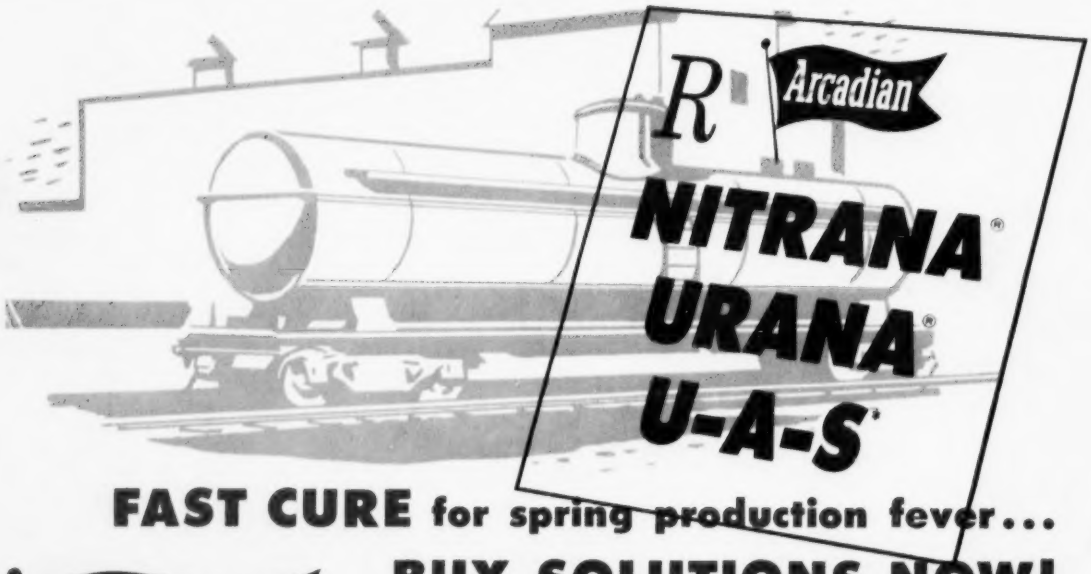
JANUARY, 1956

Commercial Fertilizer

and PLANT FOOD INDUSTRY



FAST CURE for spring production fever...

BUY SOLUTIONS NOW!

Arcadian®

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions
Nitrana®, Urana® and U-A-S*

Anhydrous and Aqua Ammonia

American Nitrate of Soda

A-N-L® Nitrogen Fertilizer

Urea Products

Sulphate of Ammonia

*Trade-mark

Now is the time to line up enough ARCADIAN® Nitrogen Solutions to carry you through the spring rush of mixed goods production and curing. You get the exact kinds of Nitrogen Solutions you need for every production program. ARCADIAN provides the broadest line of nitrogen solutions available to mixed goods manufacturers—with plant capacity to supply them early and late. ARCADIAN Solutions assure economical sources of nitrate, ammonia and urea nitrogen, and provide excellent, quick curing.

To get top-notch results pick the ARCADIAN Solutions best suited to your plant facilities. Nitrogen Division technical service representatives have a detailed knowledge of ammoniation procedures and how they can be used to solve special production and conditioning bottlenecks. Their technical aid is available at no cost to Nitrogen Division customers.

NITROGEN DIVISION Allied Chemical & Dye Corporation

New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio • Omaha 7, Neb.
Indianapolis 20, Ind. • Columbia 1, S. C. • Atlanta 3, Ga. • Columbia, Mo.
Kalamazoo, Mich. • San Francisco 3, Cal. • Los Angeles 5, Cal.

NITROGEN DIVISION ALLIED CHEMICAL

Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability

From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

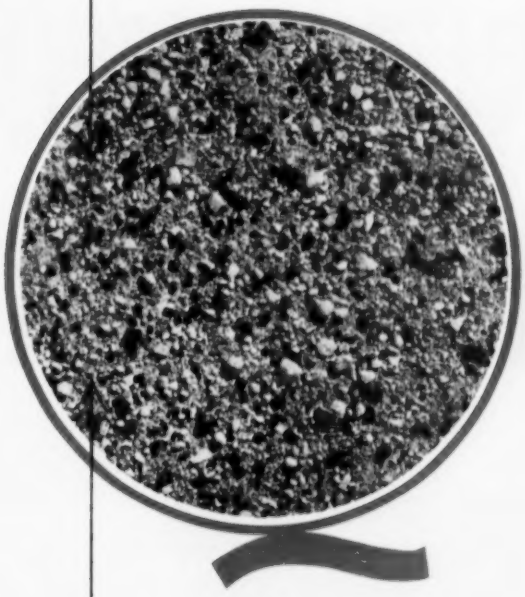
principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE



Customers

CAN

See

UALITY

in

Fertilizer

If It Contains

SMIROW

TANKAGE

PLAINLY VISIBLE in any good fertilizer mixture are the dark organic particles of Smirow . . . a sales feature easy to point out, and a satisfying mark of quality to farmers.

100% natural organic, 90% water insoluble, 90% available.

Let us figure the cost of SMIROW delivered to your plant.

SMITH-ROWLAND COMPANY

A DIVISION OF SMITH-DOUGLASS CO., INCORPORATED

NORFOLK, VIRGINIA · GRANITE CITY, ILLINOIS

It pays you, the dealer and the farmer to concentrate on the premium

CASH IN ON THE SWING WITH THESE QUALITY

SULFATE OF POTASH

High grade, low chloride *International Sulfate of Potash* can help you build a profitable volume of business on the premium fertilizers made for crops adversely affected by excess chlorides. Your farm customers will get improved quality and increased yields on high value crops such as tobacco, potatoes, vegetables, tree fruit and small fruit when they use fertilizers made with sulfate of potash. This quality plant food material is soluble, well conditioned and can be used without changing your present mixing processes.

At Carlsbad, New Mexico, *International* mines and refines these fine quality plant food materials for fertilizer manufacturers:

Sul-Po-Mag–Double Sulfate of Potash-Magnesia–22% K_2O–18% MgO
Sulfate of Potash–50% K_2O Minimum Muriate of Potash–60% K_2O Minimum
Muriate of Potash – Granular – 60% K_2O Minimum

International MINERALS & CHEMICALS

potash division

fertilizer grades needed for profitable production of many crops.

TO PREMIUM FERTILIZERS POTASH MATERIALS

Sul-Po-Mag

Sul-Po-Mag enables you to produce premium grade fertilizers with a properly balanced combination of *two* essential plant foods: *sulfate of magnesium* and *sulfate of potash*. Both are water-soluble and readily available to growing crops.

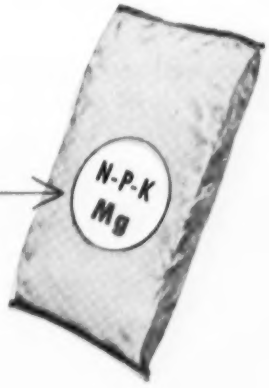
Agricultural experiment station studies show that the soils in many crop-growing areas are critically low or deficient in available magnesium. In fact, this nutrient is so important to profitable crop production, it's often called *the fourth element in the fertilizer bag*.

Sul-Po-Mag has been advertised consistently in farm papers for many years. You'll find a welcome market for premium grades containing *Sul-Po-Mag* for use on soils that are deficient in magnesium and potash. For many farmers know from experience it helps them increase crop production, increase quality and increase profits.

When you use *Sul-Po-Mag* in the bag, identify it on the bag . . . N-P-K-Mg tells farmers that yours is a premium fertilizer.

PUT IT IN THE BAG

PUT IT ON THE BAG



INTERNATIONAL MINERALS & CHEMICAL CORPORATION
General Offices: 20 North Wacker Drive, Chicago 6

Published by
WALTER W. BROWN
PUBLISHING CO., INC.
75 Third St., N. W., Atlanta 8, Georgia
Phone Atwood 4160

President
ERNEST H. ABERNETHY

Editor
BRUCE MORAN

Managing Editor
CLAY W. PENICK, JR.

Business Manager
V. T. CRENSHAW

Chicago Representative
ELON A. ABERNETHY
1200 N. Ashland Ave.—Room 544
Phone CApitol 7-4111

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone REPUBLIC 1-3050

Address all correspondence to Atlanta Publishing Offices, sending direct to COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, 75 Third St., N. W., Atlanta 8, Georgia.
Published Monthly by

Vol. 92 No. 1 *Established 1910* January, 1956

Commercial Fertilizer

and PLANT FOOD INDUSTRY

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

Contents

Commenting Freely, by *Bruce Moran* 6
Just Around the Corner, by *Vernon Mount* 10
Rapid Determination of Moisture in Fertilizers, by *Robert M. Engelbrecht* and *Rikio Kumagai* 20
Research, Results & Reports 22
Industry Calendar 22
$17,000,000 Sohio Plant 24
Ammonia Phase 24
Nitric Acid Unit 27
Urea Process 27
Open House at New Farm Service Plant 30
Around the Map 32
Fertilizer Tonnage Reports 38
Markets 38
AAI Tackles NH_3 Growth Problems 42
Tank Standards Recommended 44
Truitt Talks to Alabama Society 48
500 Expected at Midwest Soil Improvement Meeting 50
Missouri Council Short Course 51
Pacific Northwest Activities 51
Arkansas Association Elects 52
Texas Has Strong Conference Program 52
Cotton Conference Combines Beltwide Meetings 55
Southern Agronomists & Ag Workers Schedule 56
Personals 58
Crop Chemicals 60
Obituaries 64
Safety Chairmen Announced 70
Classified Advertising 71
Advertising Index 72

COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1879. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta 8, Georgia.

Commenting Freely

by BRUCE MORAN

The thing we have preached, the thing the national and local-level associations have been plugging hard, the thing that so many fertilizer salesmen have said so often to farmers, will now be presented to them in a forceful nationwide program. Nitrogen Division is carrying the ball with an elaborate advertising campaign — on a scale never before attempted — to sell the farmer on fertilizer as a way out of the price squeeze.

All through 1956, leading farm papers will carry full-page color advertisements, reaching more than 3,500,000 farmers each month. The theme will be "Fertilizer Grows Farm Profits."

In addition, Nitrogen Division promotion will reach the industry, agronomists, county agents, farm bankers and other interested and influential groups. There will be no mention of fertilizer brands, but all types of mixed fertilizers will be pushed in the messages so that every fertilizer manufacturer will be benefited.

A fine thing, a big thing . . . and one that is needed for the present, and to assure the crops we will need in the future.

STEP OUT WITH WEATHERLY

In one season, a new granulation process has proved itself, and is leading the parade. Plant after plant in the South and Mid-West has stepped out with Weatherly Controlled-Granulation goods and has demonstrated on a practical working . . . and selling . . . basis the qualities which have made this new process the talk of the industry in one short year.

Weatherly Process equipment is solid, heavy-duty-dependable. It closely controls size and uniformity of analysis. Both process and product have become the standard.

Many thousands of tons are now being produced on Weatherly Process equipment, and the plant-owners can testify that their judgement was sound and their choice good.

We will be glad to discuss conversion of your plant, and to show you the Weatherly Process in actual service.

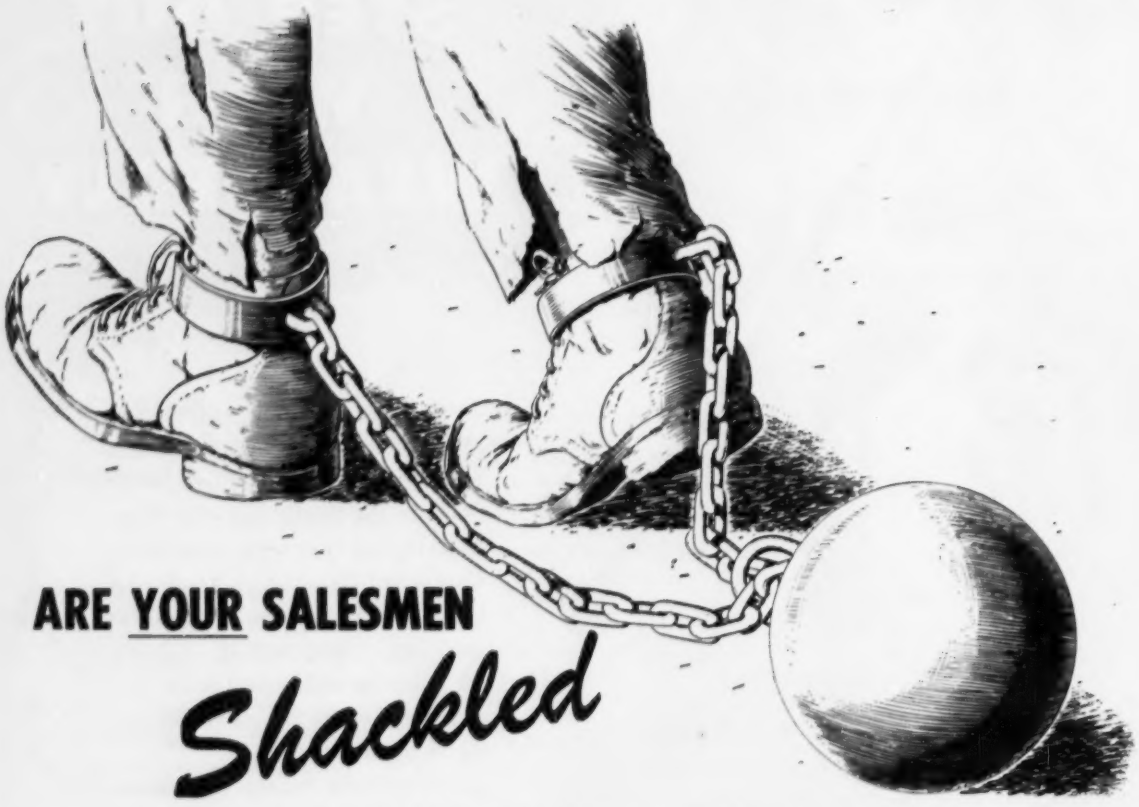
WEATHERLY GRANULATION

20-60 Tons per hour

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

830 Ponce de Leon Ave., N.E., Atlanta, Georgia PHONE: ELgin 8384



ARE YOUR SALESMEN *Shackled*

BY INADEQUATE NITROGEN?

BREAK THEIR CHAINS . . . give them a **modern** product to sell . . . a fertilizer containing UREA-FORM, the great new 38% Nitrogen that feeds evenly and safely all season long . . .ideal for mixes!

UREA-FORM is the amazing new non-leaching, non-burning, long-feeding Nitrogen developed through 15 years of USDA research—now available to you for the first time.

Put UREA-FORM in your products. Unshackle your sales department from the chains of inadequate nitrogen and watch them make money for you!

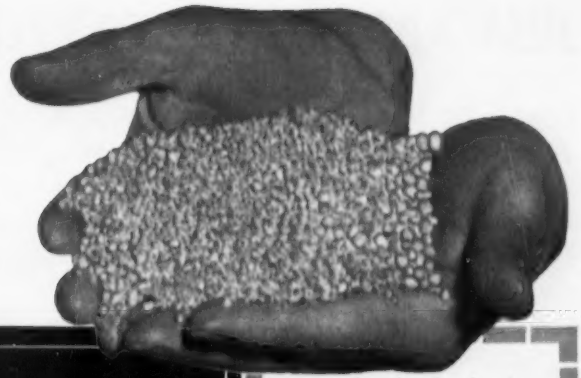
- ★ **UREA-FORM FEEDS LONGER** . . . 24 weeks or more one feeding lasts an entire growing season.
- ★ **UREA-FORM FEEDS EVENLY** . . . no soft extravagant growth . . . promotes steady, healthy development.
- ★ **UREA-FORM FEEDS SAFELY** . . . won't burn even in high temperatures and bright sunlight areas.
- ★ **UREA-FORM WON'T LEACH** . . . stays put, won't wash away, won't make harmful salts either.
- ★ **UREA-FORM IS ECONOMICAL** . . . saves up to 6 times the labor, storage space & handling you now need!

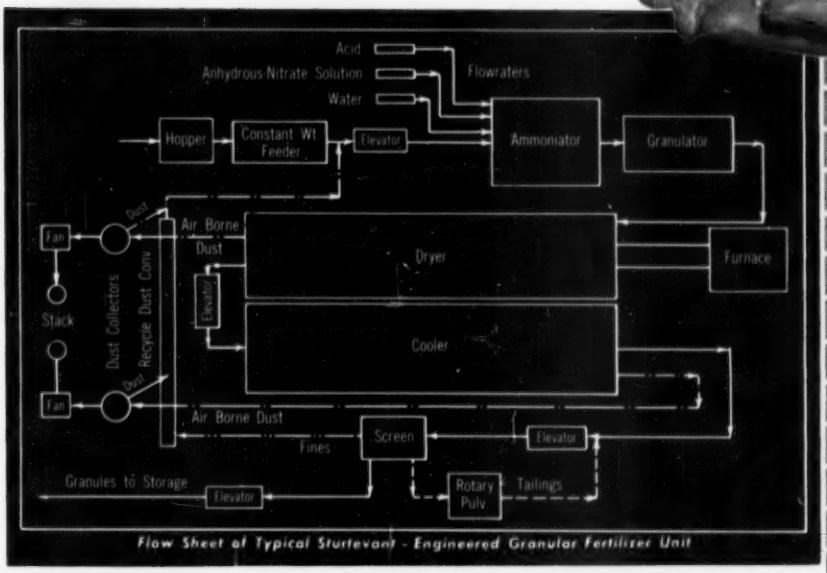
NITRO-FORM

MANUFACTURED BY:
NITRO-FORM AGRICULTURAL CHEMICALS
Division of Woonsocket Color & Chemical Co.
WOONSOCKET, R. I.

SOLE SELLING AGENT:
H. J. BAKER & BRO.
600 Fifth Avenue
NEW YORK 20, N. Y.

Granular Fertilizer Can Be in Your Future, too!





Flow Sheet of Typical Sturtevant - Engineered Granular Fertilizer Unit

LET STURTEVANT ENGINEERING AND EQUIPMENT MAKE THIS YOUR GRANULAR FERTILIZER UNIT

If you operate a mixing plant, there's a granulator in your future. The signs are unmistakable. Granular fertilizer is replacing its powdered cousin faster than modern processors can keep up with the demand.

Take the case of Canada Packers, Limited, of St. John, New Brunswick. Fourteen months after Sturtevant engineers assisted in adapting this customer's plant to a granular product, the balance of orders had shifted to 70% granular against 30% powder — *and management expects in a very short time (perhaps as you read this) that shipments will be 100% granular.*

Of course, we at Sturtevant Mill Co. are not market authorities, although we do believe this experience by Canada Packers, Limited is significant.

Our business is to assist you with the designing and engineering of the best possible granular fertilizer unit for your needs — also super phosphate units and conventional mixing units, according to your requirements.

Serving the fertilizer industry has been our business since 1873 . . . which is why you won't get rash promises or rush engineering when you come to Sturtevant. You will get a unit that will produce *what* it's supposed to *when* it's supposed to.

Why not let Sturtevant help you to spell out *your* future in granular fertilizers by writing today? Use the convenient coupon on the right.

STURTEVANT

Dry Processing Equipment

The "OPEN DOOR" to *lower* operating costs over *more* years

PULVERIZERS • CRUSHERS • MICRON-GRINDERS • GRANULATORS • SEPARATORS
SCREENS • MIXERS • FEEDERS • ELEVATORS • CONVEYORS
MECHANICAL DEN & EXCAVATORS

STURTEVANT MILL COMPANY, 111 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Granulators ☐
Also bulletins on Sturtevant machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ MIXING
☐ SCREENING ☐ FEEDING
☐ MECHANICAL DEN & EXCAVATORS ☐ ELEVATING & CONVEYING

I am interested in a new unit ☐ conversion ☐

Desired capacity is _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

JUST AROUND THE CORNER *by Vernon Mount*

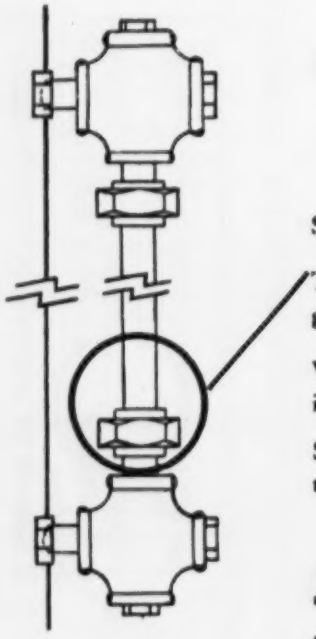
LONG HAUL there seems to be no question about the future of business in America. Even the farmer expects to pull out of his readjustment. And with the next twenty years expected to increase US population by 25% to 38% (depending on who is doing the forecasting) it seems obvious that all of us are going to be mighty busy keeping up with the demand ahead.

ON THE OTHER HAND there are those who point out that the business cycle is not yet extinct. There are a few who talk "stormy weather" ahead (perhaps in late '56). But even these do not predict anything more than a brief tightening of the general belt.

SO HAPPY NEW YEAR to all. It should be a good one for most, a bad one for very, very few. It will get another election year behind us, and should show us a bit more clearly where we stand on the international scene. Whatever happens, this will not be a dull year--you can lay to that!

Yours faithfully,

Vernon Mount



TULL designed to save you money

NITROGEN SOLUTION SYSTEM

Gauge Glass Fixtures

Simple, easy to clean, inexpensive

The combination of a Tullco modified union and rubber bulb gasket guarantees a leak-proof connection.

We have the entire system in stock—buy as a complete unit or in part.

Send for your booklet. "The Installation and Operation of a Nitrogen Solution System" to P.O. Box 4628, Atlanta, 2, Georgia.

J. M. TULL METAL & SUPPLY CO., INC.

285 Marietta St., N.W. AL 3871 Atlanta 2, Ga.

On Schedule

First Shipment Made December 15th

urea-ammonia solutions . . .
ammonium nitrate solutions . . .
anhydrous ammonia

THEY'RE on their way . . . the first cars of high-quality nitrogen solutions and anhydrous ammonia from Sohio.

We've started shipments against orders, and we're ready to serve your needs for the coming season.

So make Sohio a part of your 1956 plans. You'll find our complete line of Sohiogen solutions can mean greater flexibility, convenience and cost-cutting formulation . . . with your choice of the right solution to fit your exact needs.

Remember — our new, modern urea plant is nearing early completion . . . supplying high-quality, coated and uncoated, prilled Sohiogro Urea, for direct application sales; for fertilizer manufacture.

PROMPT SERVICE...UNMATCHED FACILITIES...UNIFORM HIGH QUALITY

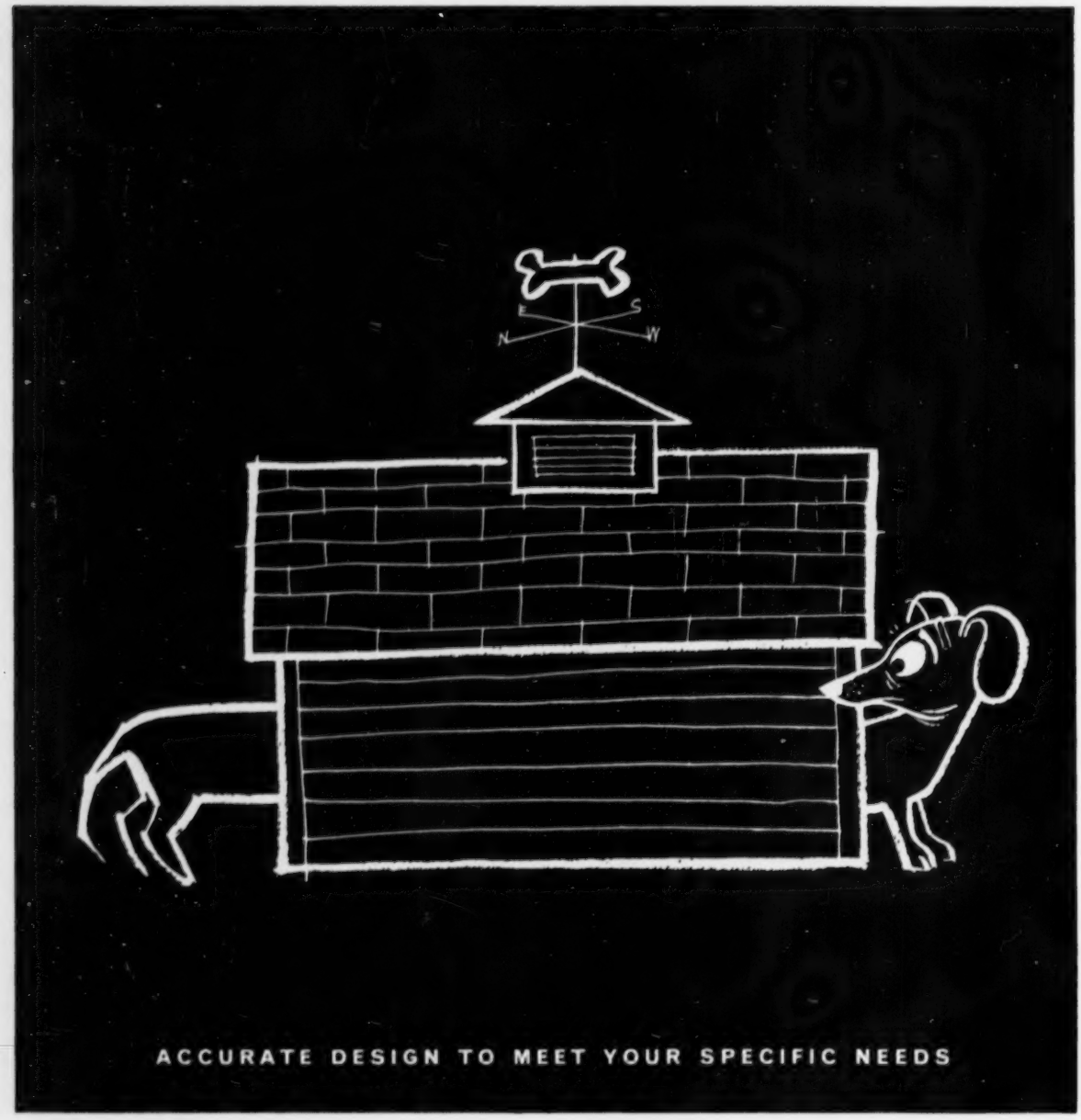
- **CENTRALLY LOCATED** in America's agricultural heartland.
- **FAST DELIVERY** 5 railroads serve Lima—Erie, B&O, Nickel Plate, DT&O, and Penna.—plus 24-hr. truck delivery within trucking areas.
- **LARGEST STORAGE FACILITIES** in the country in relation to production capacity . . . meets peak season demands.
- **GUARANTEED ANALYSIS** of every car.
- **LABORATORY** and technical service.

SOHIO

SOHIO CHEMICAL COMPANY

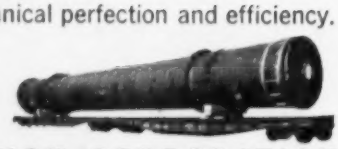
Ft. Amanda Road • Lima, Ohio

LOUISVILLE DRYERS are fitted to your job for faster, more efficient performance—lower cost in the long run!



LOUISVILLE METHOD

1. Initial survey and analysis of your particular problems.
2. Pre-testing in pilot-plant operation to assure performance.
3. *Accurate design to meet your specific needs.*
4. Top-quality fabrication in General American's own shops.
5. Follow-up checks after installation to guarantee mechanical perfection and efficiency.



LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Offices: 139 South Fourth Street • Louisville 2, Kentucky
380 Madison Avenue • New York 17, New York
General Offices: 135 South La Salle Street • Chicago 90, Illinois

"A Bird in the Hand Is Worth Two in the Bush"

And a Bag in Your Plant Is Worth Two on Order

You can rely on Albemarle's big, completely integrated Multiwall operation to give you deliveries as soon, as often and as regularly as you wish.

FOR Multiwall CALL Albemarle

ALBEMARLE PAPER MANUFACTURING COMPANY • RICHMOND, VIRGINIA

EASTERN SALES OFFICE: NEW YORK CITY • SOUTHERN SALES OFFICE: BALTIMORE, MD. • MIDWEST SALES OFFICE: CHICAGO, ILLINOIS

Now Ready to Serve You from the Heart of the Southeast with Quality ANHYDROUS AMMONIA

Our modern plant at Ketona, Ala., is now on stream producing quality anhydrous ammonia in commercial and refrigeration grades. Additional facilities to meet your requirements for nitrogen solutions of all popular formulations will also soon be completed.

Our new facility is the first commercial ammonia plant east of the banks of the Mississippi River and south of Virginia and the first in the nation to be based entirely on coke oven gas. You will find it a dependable and economical source of supply.

Our strategic location in the geographic center of the Southeast enables us to serve many customers more expeditiously and at a substantial savings in delivery costs. Responsible joint ownership by two large, nationally known companies—Hercules Powder Company, Wilmington, Del., and Alabama By-Products Corporation, Birmingham, Ala.—assures maintenance of highest quality standards.

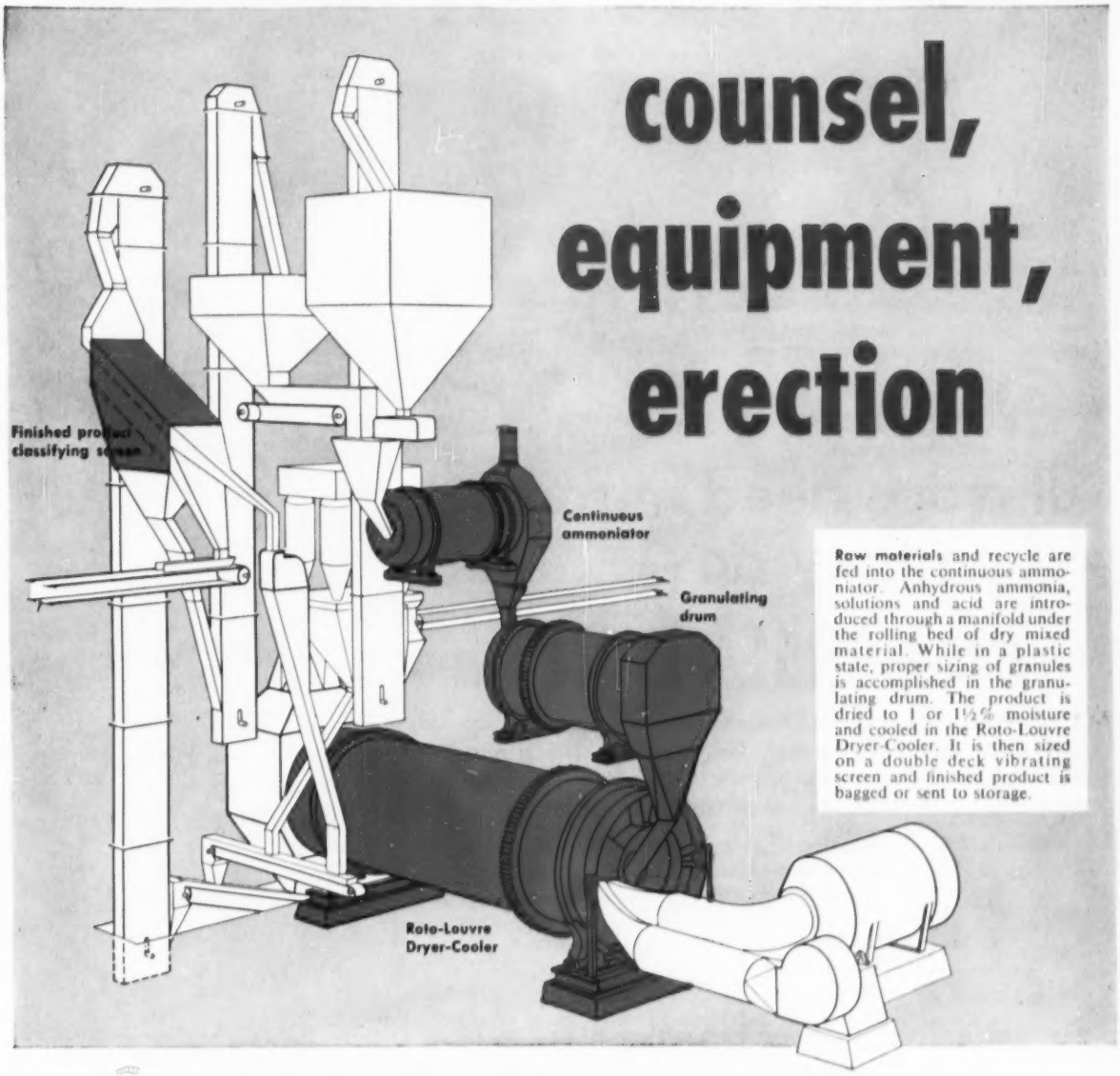
We appreciate the many orders that have been placed with us, even in advance of our plant's opening, and invite your inquiries. Phone, wire or write Alabama By-Products Corporation, Sales Agents, P. O. Box 354, Birmingham, Ala., Phone 7-5171.

KETONA

Chemical CORPORATION

For your TVA fertilizer system . . . LINK-BELT supplies

counsel, equipment, erection



Raw materials and recycle are fed into the continuous ammoniator. Anhydrous ammonia, solutions and acid are introduced through a manifold under the rolling bed of dry mixed material. While in a plastic state, proper sizing of granules is accomplished in the granulating drum. The product is dried to 1 or 1½% moisture and cooled in the Roto-Louvre Dryer-Cooler. It is then sized on a double deck vibrating screen and finished product is bagged or sent to storage.

Here's your experienced source for the continuous ammoniator process

The TVA Continuous Ammoniator Process answers the need for a system producing high-grade granular fertilizer with low initial and material costs. An efficient method utilizing anhydrous ammonia and ammonium nitrate solutions, it's adaptable to both new and existing plants. Several installations already have been supplied by Link-Belt, some self-liquidating in a year's production. And Link-Belt offers you complete facilities for design, equipment and erection that assure efficient performance for your plant.

Granular, conventional nitrophosphate, ammonium phosphate, ammonium nitrate, ammonium sulphate, urea—Link-Belt has experience with all of them. Whether you're building a new plant or remodeling your present system, our broad facilities are your assurance of top performance and on-schedule delivery. For details, contact your nearest Link-Belt office.

LINK-BELT

CONVEYING AND PROCESSING EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 15); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,960

All crops need nitrogen. When they do . . .

SELL HORSE & LION NITROGEN FERTILIZERS

ALL HORSE & LION nitrogen fertilizers are easy to spread—because they're granulated for that particular purpose. So they are easy to handle, and easy to apply. If you want to sell the **best,** at competitive price, **offer "Horse & Lion" nitrogen fertilizers**—five different types and concentrations for various requirements:

HORSE & LION Calcium Nitrate: 15½% pure nitrogen, combined with about 28% available lime. Granulated.

HORSE & LION Calcium Ammonium Nitrate: 20½% pure nitrogen (10¼% nitric and 10¼% ammonic nitrogen) and approximately 33% calcium carbonate. Granulated.

HORSE & LION Ammonium Sulphate Nitrate: 26% pure nitrogen (11% nitric and 15% ammonic nitrogen). Granulated.

HORSE & LION Urea 44: 44% pure nitrogen. Coated pellets for dry use.

HORSE & LION Urea 46: 46% pure nitrogen. Pellets without coating for liquid application or dry use where fast dissolving desired.

For complete information and prices, contact your nearest "HORSE & LION" fertilizer headquarters.

ATKINS, KROLL & CO.

Established 1906

EXCLUSIVE DISTRIBUTORS, U. S. A.

500 Fifth Avenue, New York 36, New York
417 Montgomery Street, San Francisco 4, California
417 South Hill Street, Los Angeles 13, California
421 S.W. Sixth Avenue, Portland 4, Oregon

Your best assurance for a *continuous* supply is a completely integrated supplier!

Kraft Bag Corporation comes closest to being the most completely integrated manufacturer of multiwall shipping sacks in the industry!

Check this chart and see for yourself why Kraft Bag Corporation should be your supplier!

Tell us when we may call to discuss your requirements.

FEATURES	KRAFT BAG CORPORATION	OTHER SOURCES ?
Forest Lands	✓	
Pulp Mill	✓	
Bleach Plant	✓	
Paper Mill	✓	
Multiple Bag Plants	✓	
Natural Kraft	✓	
Colored Kraft	✓	
Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags—sewn or pasted	✓	
Open Mouth Bags—sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
KRAFT-lok Valve Closure	✓	
Creped Tape	✓	
Gummed Tape	✓	
Filter Cord	✓	
Sewing Thread—(the only material we do not produce ourselves)		
1-2-3-4 Color Printing	✓	
Art Department	✓	
Bag Development and Research	✓	

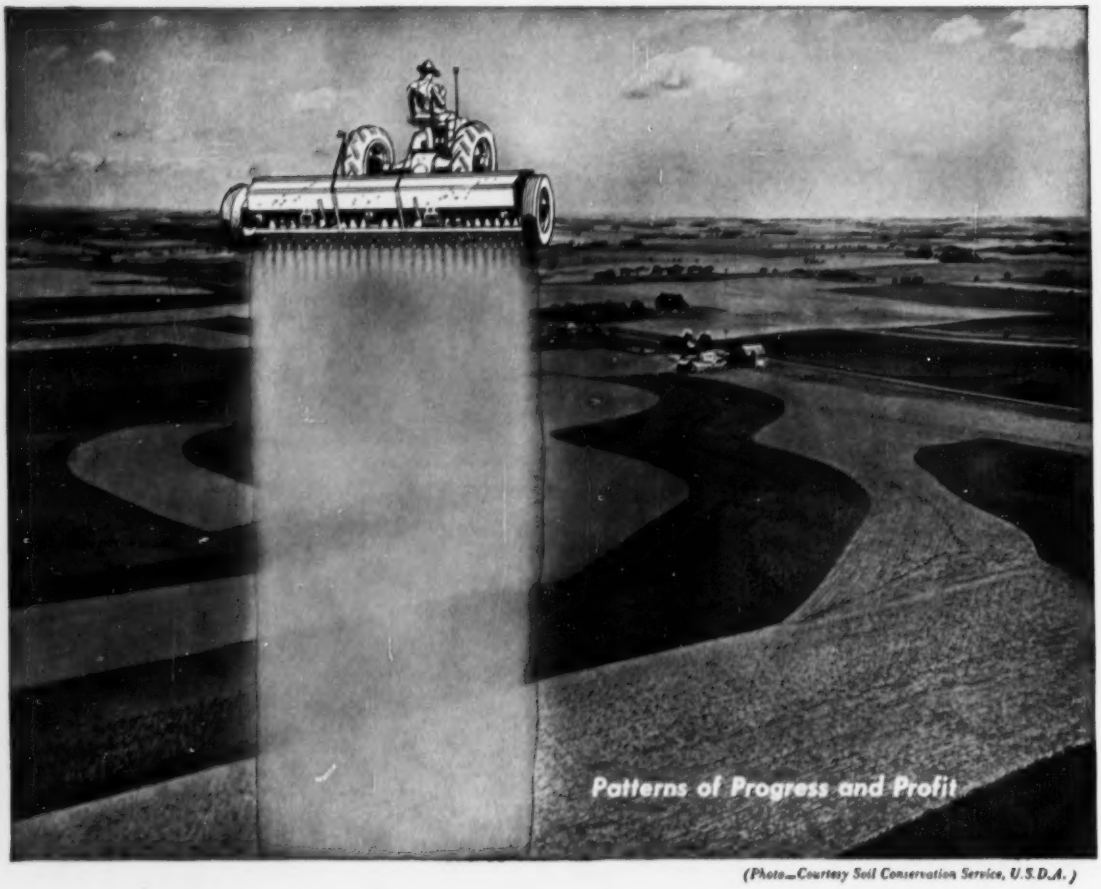
Gilman PAPER CO.
• St. Marys Kraft Corp.
• Gummed Tape Div.
• The Gilbound Corp.
• Kraft Bag Corp.

3 Generations of Bag Making Experience

KRAFT BAG CORPORATION

Exclusive Sales Agents for Kraftpacker Automatic Open Mouth Bag Filling Machine

630 Fifth Avenue, New York 20, N. Y. • Daily News Bldg., Chicago 6, Ill.
Plants at St. Marys, Georgia and Gilman, Vermont



(Photo—Courtesy Soil Conservation Service, U.S.D.A.)

High Grade Muriate of Potash

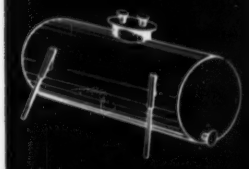
by DUVAL

Duval Muriate of Potash ranks high as one of the essential nutrients which greatly increase yield and profits in crop production.

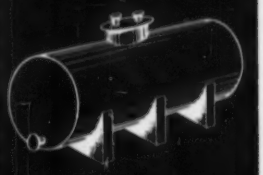
DUVAL SULPHUR and POTASH CO.
Modern Plant and Refinery at Carlsbad, New Mexico

Address all communications to:
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
ATLANTA, GEORGIA
Cable Address: Ashcraft

NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • JACKSON, MISS. • COLUMBUS, OHIO • DES MOINES, IOWA



Abrasion and Corrosion Engineering Company
P. O. Box 3568, Amarillo, Texas
Gentlemen:
Without obligation, please send me complete information on low-cost A&C rubber-lined tanks.
Name_____
Company_____
Address_____
City_____ Zone____ State_____



DELIVERY IN LESS THAN 30 DAYS ON THESE LOW-COST, DUAL-PURPOSE TANKS

Solve liquid fertilizer storage problems quickly, economically and efficiently. A&C rubber-lined tanks are ready for prompt delivery. They assure complete corrosion protection from both phosphoric acid and nitrogen solutions . . . cost far less than any other type of dual-purpose tank. Send coupon for complete information today!

Abrasion Corrosion Engineering Company

ABRASION & CORROSION ENGINEERING CO.

P. O. BOX 3568 AMARILLO, TEXAS

ASHCRAFT - WILKINSON CO.

Fertilizer *Oil Seed*

Materials *Meals*

Home Office: ATLANTA, GA.
Cable Address
ASHCRAFT

Offices: NORFOLK, VA., CHARLESTON, S. C.
TAMPA, FLA., JACKSON, MISS., COLUMBUS, OHIO

Exclusive Distributors: DUVAL SULPHUR & POTASH COMPANY
and ESCAMBIA BAY CHEMICAL CORPORATION

AMMONIATES — FEED STUFFS — SULPHUR — POTASH
INDUSTRIAL AND AGRICULTURAL
CHEMICALS

USE OF INFRA RED LAMP FOR Rapid Determination Of Moisture IN FERTILIZERS

by
ROBERT M. ENGELBRECHT
Research Department
Lion Oil Company
El Dorado, Arkansas

and
RIKIO KUMAGAI*
Fertilizer and Agricultural Lime Section
Soil and Water Conservation Research Branch
U. S. Department of Agriculture

Free moisture content is one of the most important factors governing the efficient production of well-conditioned mixed fertilizers. This is especially true of granulation processes in which accurate control of temperature and moisture relationships must be maintained for most efficient agglomeration **(2).** Existing methods for determination of either free or total moisture content of fertilizers **(1)** are generally too time-consuming for effective use in process control work.

The present paper reports the results of a study conducted to determine the applicability of a commercially-available instrument using an infrared lamp as the heat source for the rapid determination of moisture in fertilizers. Results obtained with this instrument on sundry commercial mixed fertilizers and fertilizer materials are compared with results obtained by the vacuum desiccation method **(1).**

Equipment

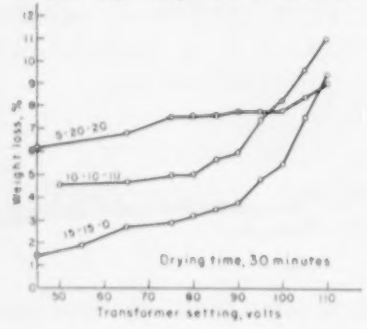
The drying instrument consists essentially of a 125-watt infrared lamp contained in a ventilated compartment and a torsion balance assembly equipped with magnetic damper, all housed in a body of cast aluminum. A hinged trap door to which the lamp is attached is opened to permit direct weighing of a 5-gram sample into a combination weighing and drying pan. The pan is balanced by manipulation of a knurled wheel adjacent to a glass window in the housing through which a dial and indicator needle are visible. The dial is graduated from 0-100% in 0.2% divisions with each division equivalent to 10 milligrams of sample weight. Thus, the loss in weight of a 5-gram sample is directly indicated in percent. Readings may be taken at any time during the operation without disturbing the sample. In drying position, the lamp surface is a uniform distance of about 3 inches above the pan surface. Insertion of a variable transformer and voltmeter in the circuit permits control of the applied voltage and thus of the heat intensity.

Procedure

Fertilizer materials and mixtures selected for the tests included a variety of commercially-produced fertilizers differing in grade and formulation; also several common fertilizer materials as shown in Column 2 of Table 1. Samples were ground to pass a 20-mesh (0.83 mm. opening) sieve according to the A. O. A. C. method for sample preparation **(1).**

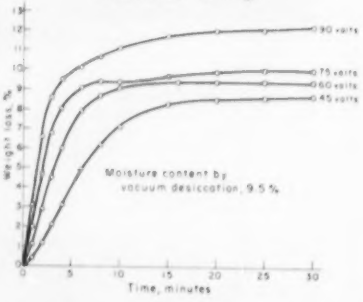
Preliminary investigations with these fertilizers using an input voltage to the lamp of 110 volts disclosed that many fertilizer materials are subject to decomposition or oxidation at that setting. To determine the relationship between applied voltage and weight loss over a given period of time, samples were dried for 30 minutes at different voltage settings and percentage weight losses were plotted against transformer settings. Characteristic curves for three of the mixtures tested are shown in Figure 1. Examination of the curves shows pronounced breaks or changes in slopes at percentage weight losses slightly in excess of the respective free moisture contents of the mixtures, **i.e.,** 7.0% for the 5-20-20, 4.8% for the 10-10-10 and 2.2% for the 15-15-0 fertilizer as determined by the A. O. A. C. procedure **(1).** The A. O. A. C. method involves overnight drying of samples over a desiccant such as anhydrous magnesium perchlorate contained in a desiccator subjected to a vacuum of 20 inches or more of mercury. The breaks in the curves apparently indicate initial release of components other than free moisture such as water of crystallization or decomposition gases. These characteristic breaks occurred at transformer settings of about 65 volts for the 15-15-0 fertilizer, 80 volts for the 10-10-10 and 75 volts for the 5-20-20 fertilizer and generally within the range 60 to 80 volts for all the samples listed in Table I.

FIGURE 1
Effect of Varying Transformer Settings on Percentage Weight Loss of Fertilizers



A standard transformer setting suitable for general use with all mixed fertilizers was desired. To obtain this, a family of conventional drying curves (weight loss versus drying time in minutes) was obtained at settings of 45, 60, 75 and 90 volts for each of the samples. Typical curves obtained with ordinary and triple superphosphates are shown in Figures 2 and 3.

FIGURE 2
Drying Curves of Ordinary Superphosphate at Various Transformer Settings

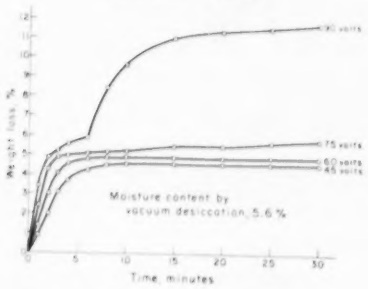


A reliable procedure is considered to be one that produces a definite weight loss within a reasonably short period of drying—a condition characterized by a curve that is very steep for short drying periods and then levels off into a substantially horizontal line **(3).** These conditions were met by curves obtained at the

*Present address: Olin Mathieson Chemical Corporation, 275 Winchester Ave., New Haven, Connecticut.

60-volt setting by 17 of the 18 materials tested and at the 75-volt setting by 11 of the 18 materials. The common exception was cocoa shell meal which also gives unreliable results with the vacuum desiccation method **(3)**. The other six materials yielded results at 75 volts which did not meet the conditions given above included 0-12-12, 0-15-30, 15-15-0 and 8-12-20 mixed fertilizers as well as both ordinary and triple superphosphates shown in Figures 2 and 3. Figure 2 shows that a drying period of 15 minutes at the 60-volt setting was sufficient to release substantially all of the 9.5% free water contained in the sample of ordinary superphosphate. Further examination of the data in Figures 2 and 3 indicate that a transformer setting of 75 volts may be used in conjunction with a drying period of 10 min-

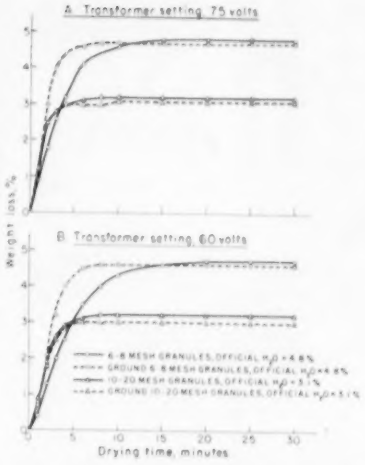
FIGURE 3
Drying Curves of Triple Superphosphate at Various Transformer Settings



utes to give less reliable but reasonable results. Since the time required for analysis is an essential consideration in process control, results obtained with both precedures, **ie.,** 15 minutes at 60 volts and 10 minutes at 75 volts were compared with those obtained by the official method. Results are shown in Table 1.

Moisture contents by the vacuum desiccation method ranged from 0.9% for sand (Sample 18) to 12.6% for ammoniated triple superphosphate (Sample 16). Results obtained at 60 volts and 15 minutes plus or minus deviations as compared with vacuum desiccation results ranging from −0.7% to +0.8% with an average deviation of −0.2%. Only two materials showed deviations greater than 0.5% and they were triple superphosphate, −0.7% and cocoa shell meal, +0.8%. The moisture contents of these materials by vacuum desiccation were 5.6 and 3.7%, respectively. At 75 volts and 10 minutes, the average deviation was +0.2% and sample deviations varied from −0.5% for washed sand to +1.4% for cocoa shell meal. Two materials in addition to cocoa shell

FIGURE 4
Effect of Sample-Grinding on Drying Curves of 12-12-12 Fertilizer



meal showing deviations greater than +0.5% were 8-12-20 fertilizer with a +0.9% deviation and ammoniated triple superphosphate with a +0.8% deviation from values of 5.9 and 12.6%, respectively, as determined by the official method.

Results by the lamp procedure at both voltages generally showed good agreement with those obtained by the vacuum-desiccation method for samples containing from 2 to 12% moisture and indicated that the infrared lamp assembly may be used satisfactorily for rapid determinations of moisture in fertilizers.

Effect of Free Acid Content

All A. O. A. C. official methods of analyses for determination of moisture in fertilizers, with the possible exception of the vacuum desiccation method, have been known to give erratic results with hydrated materials containing appreciable amounts of free acid. Samples of calcium sulfate, dihydrate, with acid contents ranging from 0 to 2% were prepared by drenching the acid-free material with an ether solution of 40% aqueous phosphoric acid and allowing the ether to evaporate at 35 to 40° C. These materials were then tested at voltage settings of 60 and 75 volts. The data (Table II) show that deviations from results by the official method increased progressively with increase in free acid content and that even the 60-volt procedure gave unreliable results with calcium sulfate containing over 1% free acid.

Sample Preparation

The official method for preparation of fertilizer samples for analysis requires grinding of samples to pass a 20-mesh Tyler sieve or equivalent **(1)**. Such handling, though essential for accurate chemical analyses involving one- or two-gram analytical samples is not only bothersome but permits premature loss of some moisture. Therefore tests were con-

Table I
Moisture Content of Fertilizers by the Infrared Lamp Procedure as Compared with Results by the A. O. A. C. Vacuum Desiccation Method

No.	Sample Description	Moisture Content by Vacuum Desiccation	Weight Loss with Infrared Lamp, 60 volts, 15 min.	Deviation from Vacuum Method	Weight Loss with Infrared Lamp, 75 volts, 10 min.	Deviation from Vacuum Method
		%	%	± %	%	± %
1	0-12-12	4.4	4.0	−0.4	4.3	−0.1
2	0-15-30	6.3	6.0	−0.3	6.1	−0.2
3	14- 0-14	2.5	2.5	0.0	2.9	+0.4
4	15-15- 0	4.1	3.8	−0.3	4.0	−0.1
5	8-32- 0	6.3	6.3	0.0	6.6	+0.3
6	10-10-10	7.0	6.6	−0.4	7.2	+0.2
7	12-12-12	3.8	3.6	−0.2	3.7	−0.1
8	8-16-16	5.7	5.5	−0.2	6.0	+0.3
9	8-24- 8	6.6	6.8	+0.2	7.0	+0.4
10	3-12-12	8.9	9.0	+0.1	9.0	+0.1
11	6- 9-12	6.0	5.8	−0.2	6.1	+0.1
12	8-12-20	5.9	6.0	+0.1	6.8	+0.9
13	Superphosphate, 20%	9.5	9.4	−0.1	9.4	−0.1
14	Superphosphate, 48%	5.6	4.9	−0.7	5.2	−0.4
15	Ammoniated Super, 4-18-0	4.5	4.0	−0.5	4.4	−0.1
16	Ammoniated Super, 7-44-0	12.6	12.1	−0.5	13.4	+0.8
17	Cocoa shell meal	3.7	4.5	+0.8	5.1	+1.4
18	Sand, washed	0.9	0.4	−0.5	0.4	−0.5
	Average Deviation			−0.2		+0.2

Table II
Effect of Free Acid Content on Moisture Determinations

Sample	Moisture Content by Vacuum Desiccation	Weight Loss with Infrared Lamp	
		60 volts, 15 min.	75 volts, 10 min.
	%	%	%
$CaSO_4 \cdot 2H_2O$, acid-free	0.0	0.0	0.2
$CaSO_4 \cdot 2H_2O$, 1% H_3PO_4 added	0.1	0.3	0.7
$CaSO_4 \cdot 2H_2O$, 2% H_3PO_4 added	0.5	2.2	3.2

ducted to determine whether the infrared lamp procedure would yield reliable results in the case of unground commercial granular fertilizers. Figure 4, A and B, shows drying curves obtained at 75 and 60 volts for 6-8 mesh (3.32-2.36 mm.) and 10-20 mesh (1.65-0.83 mm.) granules of 12-12-12 fertilizer. At both voltages, unground samples consistently released from 0.1 to 0.2% more moisture than the corresponding ground samples and indicated that the infrared procedure is suitable for granular materials. However, the data also indicate that an additional 5 minutes of drying time may be required, i.e., a total of 20 minutes at 60 volts or 15 minutes at 75 volts.

Summary

A study was conducted to determine the applicability of a commercially-available instrument utilizing an infrared heating lamp for the rapid determination of free moisture in mixed fertilizers. With proper use of the instrument generally reliable results were obtained in 10 to 15 minutes at applied voltages of 60 to 75 volts and indicated that the instrument is suitable for process control work in fertilizer production.

Acknowledgment

The authors are indebted to J. O. Hardesty of the U. S. D. A. Soil and Water Conservation Research Branch, to M. D. Barnes of the Lion Oil Company and to G. L. Turner, formerly of the Eastern States Farmers' Exchange, for valuable aid in this study.

LITERATURE CITED

1. *Assoc. Offic. Agr. Chemists "Methods of Analysis," 7th ed., pages 6-8 (1950).*
2. *Hardesty, John O., Szabo, Andrew, and Cummings, J. G., "Some Effects of Formulation on Granulation of Mixed Fertilizers," presented before the Division of Fertilizer and Soil Chemistry, 128th Meeting, Am. Chem. Soc., Minneapolis, 1955.*
3. *Hill, W. L., Caro, J. H., and Kumagai, R., "Report on Free Water in Fertilizers," J. ASSOC. OFFIC. AGR. CHEMISTS 34, No. 3, 641-53 (1951).*

RESEARCH RESULTS & REPORTS

Flower life can be prolonged by putting a small percentage of hexachlorophene in the water with cut flowers, according to Drug Houses of Australia Ltd.

* * *

Soil test saved a lot of money for an Alabama farmer, whose cotton was doing poorly despite 500 pounds of 4-10-7 per acre plus 100 pounds of N as side-dressing. API did a soil test for him on recommendation of the County Agent. Now he uses 300 pounds of 4-12-12 plus 120 pounds of ammonium nitrate . . . and it does the job.

* * *

Flax responds well to more N and good weed control out in Minnesota, where average yield has been 10 bushels per acre, and now farmers are disappointed if the harvest is less than 20 bushels, according to speakers at the Flax Institute meeting.

* * *

Tomato life is extended by the use of perforated cellophane and polyethylene packaging, and these do better than cellulose acetate and unperforated cellophane. However all of these definitely extended the shelf-life of tomatoes in experiments conducted by the New Jersey AES.

* * *

Huge Grapes, twice and three times normal size, and resistant to disease, have been developed by the use of cochicine, which doubles the normal number of a plant's chromosomes, according to USDA.

* * *

Soil plasma—dextrans—the chemical used as blood plasma substitute—turns out to boost plant growth as much as 70%, according to American Chemical Society information.

* * *

Lebensraum is needed for plants, too, according to the Connecticut AES. Room for roots, deep tillage, is the subject of a study which they will send you free. Write them at Box 1106, New Haven 4, and ask for "Frontiers of Plant Science" . . . it's free.

* * *

No use to till deep, says J. A. Hobbsn, Kansas State Agronomic, who claims that deep chiseling does not seem to better moisture or root penetration. However, his studies are incomplete, and he will report more later.

* * *

Dusting school is open at Texas A&M. A course in crop-dusting, the first college-sponsored training school in history, is headed by Prof. Fred E. Weick, who runs the personal aircraft research center at the Texas Engineering Experiment Station, with agronomists to round out the program.

* * *

Air application of fertilizer proved 20 times as fast as ground application in fertilizing rangelands under experiment at the University of California station at Hopland. They tried it on 140 rough, rolling acres, which was fertilized in four hours by air, for about 1 cent per pound.

* * *

Clay steals phospate fertilizers from plants, according to a research project by Dr. Tsuneo Tamura of the Connecticut AES, where the soil has a layer of alumina sandwiched between two layers of silica—a combination in which the mineral makes no contribution to plant growth.

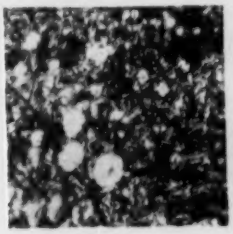
* * *

"Range Resources of the South" is the title of a well-done booklet turned out by the Southern Section of the American Society of Range Management, in cooperation with the Georgia Experiment Stations. It's called Bulletin N.S.9, if you'd like to ask for one. It covers the highlights of nine broad types of Southern range, and is a compilation of the material first presented as an exhibit at the January 1954 annual meeting of the Southern Section.

INDUSTRY CALENDAR

Date	Organization	Place	City
Jan. 16-18	Sou Weed Conf.	Jung	New Orleans, La.
Feb. 6-8	Sou. Ag. Workers	Biltmore	Atlanta, Ga.
Feb. 15-17	Western Weed Control Conf.	Univ. of Calif.	Davis, Calif.
Feb. 16-17	Middle West Soil Imp.	Edgewater Beach Hotel	Chicago, Ill.
Mar. 4-6	Sou Safety	Biltmore	Atlanta, Ga.
Mar. 14-18	Nat'l Ag. Chem.	Hollybeach	Hollywood Beach, Fla.
June 10-13	NPFI	Greenbrier	White Sulphur, W. Va.
June 28-30	Sou Control	Roanoke	Roanoke, Va.
June 28-30	Pacific N.W.		Yakima, Wash.
July 18-20	SW Grade	Bucaneer	Galveston, Tex.
July—	Eastern Canada		Mont Tremblant, Que.
Oct. 19	Control Officials	Shoreham	Washington, D. C.

FROM PLANT TO PLANT



TRIPLE SUPERPHOSPHATE

1. **RUN-OF-PILE FOR MAXIMUM AMMONIATION**
2. **GRANULAR FOR DIRECT APPLICATION**
3. **PROMPT SERVICE TO MEET EVERY REQUIREMENT**

The complete service offered with Triple Superphosphate from U. S. Phosphoric Products makes it your best choice from every point of view. Production controls assure the superior quality and dependability of these phosphate fertilizers; the service extras offered by Bradley & Baker assure their maximum contribution to your sales and profits. Our sales representatives will gladly help you plan your shipments.

U.S. PHOSPHORIC PRODUCTS
Division TENNESSEE CORPORATION
Tampa, Florida

TC
TENNESSEE CORPORATION

Sales agents: BRADLEY & BAKER
155 EAST 44th STREET • NEW YORK 17, N. Y.

District Sales Offices: ATLANTA, GA. • INDIANAPOLIS, IND.
ST. LOUIS, MO. • NORFOLK, VA. • HOUSTON, TEX.

$17,000,000 SOHIO PLANT

First shipments of products to customers were dispatched December 15 by the Sohio Chemical Company from the new $17,000,000 Sohio plant at Lima, Ohio as work was being pushed to complete the other units in this big modern petrochemical plant.

One carload each of aqua ammonia, urea ammonia solutions, nitric acid, and ammonia nitrate solutions was in the first shipment. First shipment of urea by the Sohio Chemical Company is scheduled in February, according to Edward F. Morrill, president.

While some products were scheduled for shipment during the next few weeks, the bulk of production is going into storage for inventory so that the company can give better service when full-scale shipment schedules start in January.

"Where only a few months ago was a nine-hole golf course, the Sohio plant is now nearing completion as one of the most efficient petrochemical manufacturing plants in its field," the firm's president declared.

"Construction still goes on with the unit, the CO_2 plant, scheduled to go into production in early May. One hundred and eighty men and women will be employed by this company."

Lima was chosen for the site of the Sohio plant because of the ready availability of raw materials, good railroad shipping facilities, and central location with respect to both agricultural and industrial markets for Sohio petrochemical products.

The five major railroads servicing the Lima area permit direct line shipments into most areas of the agricultural Midwest. Sohio will supplement this rail delivery service with a fleet of its own truck transports, insuring alternate facilities during critical agricultural production periods.

Sohio's nitrogen products are being sold to manufacturers of conventional dry fertilizers, producers of liquid fertilizers, and for direct application to the soil. The many formulae of ammoniating and nitrogen solutions provide the proper material for the most complex requirements.

Sohio chemical products to be marketed through agricultural channels include anhydrous ammonia, aqua ammonia, ammoniating solutions, nitrogen solutions, urea fertilizer compounds, and feed grade urea. Sohio offers a selection of 13 varying combinations of ammonia, ammonia nitrate, and urea in the Sohiogen and Sohiogro solution line, the most complete choice offered from any source in the country, according to H. J. Coleman, sales manager.

Technical service offered by engineers, chemists, and agronomists is available to all Sohio customers. Constant research for improved methods and applications of Sohio chemicals is provided by the company's research and development laboratories in Cleveland.

Ample storage facilities for ammonia, ammonium nitrate, nitric acid, and urea have been provided at this plant to enable Sohio to build up reserves of products before the start of peak season shipments, so that the company can increase substantially normal shipping capacity if necessary in critical high-consumption periods. These storage facilities will assure an adequate supply for the fluctuating agricultural demand produced by varying weather conditions.

Sohio's new petrochemical plant consists of five process units, an office headquarters building, a laboratory building, a locker building for the plant employees, a steam plant, and an electrical sub-station. The process units are: the ammonia unit, the nitric acid unit, the urea unit, the carbon dioxide (dry ice) unit, and the solutions blending unit.

Basic product of the Sohio plant is anhydrous ammonia, which is also used as a base for three other products.

SOHIO'S AMMONIA PHASE

This new 300-tons per day synthetic ammonia plant has been designed to employ the M. W. Kellogg process of Steam Methane Pressure Reforming, in which natural gas and refinery gas are used as starting materials. In general, this process introduces a number of design innovations to ammonia production. Unique to the process, for example, is a reforming step which results in 25 to 35 per cent savings in compressor horsepower. A special quench-type reactor which allows optimum temperature control also contributes to improved ammonia yields and lower operating costs of the process . . . and, close control of temperature obtained in the reactor leads to longer catalyst life, lower maintenance costs, and higher conversion per pass.

The first basic step in the production of ammonia at Lima is gas preparation, in which desulfurized natural gas and refinery gas from the plant's catalytic reformer are converted to raw synthesis gas, containing hydrogen, nitrogen, carbon dioxide, carbon monoxide, argon and residual methane.

The natural gas used by the plant is essentially sulfur-free, but a natural gas desulfurizer has been provided to insure minimum concentration and to guard against unanticipated larger amounts of sulfur. Desulfurization of the natural gas is achieved by contacting the gas with bauxite and iron oxide. Desulfurization of the cat reformer gas is achieved by scrubbing with MEA (Monoethanolamine), followed by a caustic scrub. Provision has been made in the plot plan for the installation of a second unit if required.

After desulfurization, the gas feed is reformed with steam over nickel catalyst in a pressure reforming furnace. This furnace converts about 70 per cent of the feed into synthesis gas. The partially reformed gas then flows to a combustion chamber, nitrogen in the form of air is introduced into the stream, and the gas, steam and air pass downward through a bed of nickel catalyst. The heat of combustion of the oxygen in the air supplies the energy required to reform the remainder of the feed, and elevate the gas temperature to approximately 1700 F.

As the mixture leaves the combustion chamber, its temperature is lowered by direct contact with water sprays in a quench chamber. This not only brings the temperature to a level required by the next step,

"shift" reaction, but also provides the steam required in the reaction.

In the "shift" converter, carbon monoxide in the stream reacts with steam over an iron oxide catalyst to form hydrogen and carbon dioxide, and the gas feed is ready for gas purification.

The next step is the removal of the carbon dioxide in a regenerative MEA system.

This method of removing CO_2 used to produce urea, has five advantages: no oxygen contamination, negligible synthesis gas loss, essen tially complete removal, a high purity product, and compactness o' equipment.

In this purification step, raw synthesis gas is compressed and processed to yield a hydrogen-nitrogen synthesis gas in a very high state of purity. The compression is provided by a two-case centrifugal compressor, followed by two parallel reciprocating compressors, each with three stages. These compressors are all motor driven.

Removal of the bulk of the carbon dioxide is done at the discharge pressure of the centrifugal compressor. Gas from the second case of the centrifugal compressor passes through an aftercooler. It is introduced into the bottom of the CO_2 absorber where counter-current extraction by an aqueous regenerative MEA solution is used to absorb the carbon dioxide.

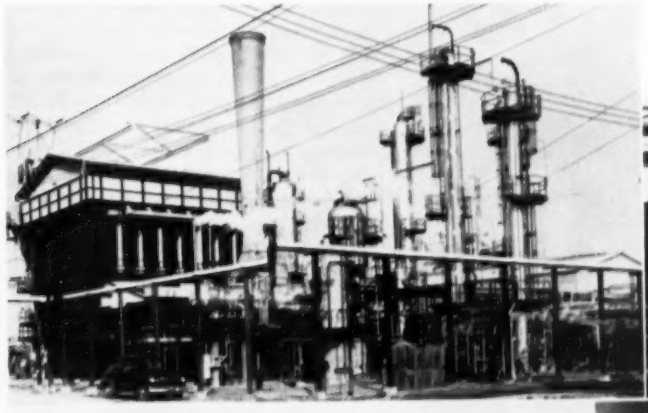
Spent MEA released from the absorber is heat-exchanged against hot stripped solution and introduced into the top of a stripping column. Carbon dioxide stripped from the solution passes off overhead from the reflux drum. A portion of the carbon dioxide flows to the battery limit for use in the urea unit. Lean solution from the bottom of the stripper is cooled by exchange with the rich solution, and is pumped back to the top of the absorber through a cooler. Two parallel motor-driven pumps have been provided for this use.

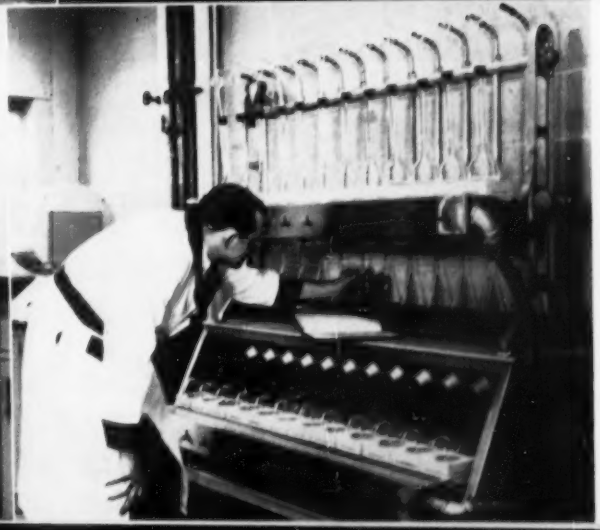
Following this operation, traces of carbon monoxide left in the stream are removed. Process gas overhead from the CO_2 absorber flows to the reciprocating compressors through a suction knock-out drum. It goes through two stages of compression with intercooling and water separation between stages before introduction to the next purification step. Carbon monoxide and residual carbon dioxide are removed by treatment with a copper solution in the CO absorber, which operates at 2100 psig, followed by contact with caustic solution in the caustic scrubber.

Purified gas flows from the caustic tower through a suction drum to the third stage of compression. It is discharged at 5000 psig from the compressors to the synthesis section.

The purified synthesis gas containing hydrogen and nitrogen in a 3:1 volumetric ratio is then fed to a twin-converter circulation system. The feed joins recycle gas from the discharge of two motor-driven recycle compressors and the combined stream passes through an oil sep-

SOHIO PLANT PICTURES





At top left, basic unit of the new Sohio petrochemical plant at Lima, Ohio, is the ammonia plant. This photo shows a view of this unit with the furnace on the left, and the gas scrubber for removal of sulphur and the scrubber towers in the right foreground. Top right: First of the Sohio Chemical Company tank cars is shown here at the railroad loading facility of the Sohio petrochemical plant in Lima, Ohio. This facility is part fo Sohio's semi-automatic shipping system which incorporates the latest in pneumatic and electrical instrumentation capable of the simultaneous loading of five different products at the railroad loading facility and four products at the truck loading installation. The shipping facilities permit the loading of 60 railroad cars of liquid materials per day. Bagged products may be shipped by rail or truck in loose or palletized loads. The design provides for bulk shipments of either box cars or hopper-bottom cars as required to satisfy customer unloading facilities. Below, left: During the production of ammonia, the various streams in the operating unit are continuously checked by infra-red analyzers. These analyzers have been installed in these places to insure constant quality of product. In addition they indicate the operating variation so that Sohio can protect the unit and insure continuity of operation. Robert Wadsworth is the chemist at this unit. Below, right; Sohio uses a Kjeldahl Rack to determine nitrogen content of solutions. Here Chemist Richard Rich is making a test. Every operating unit in the Sohio petrochemical plant has its own small laboratory in order to provide close control on operations. In addition, a plant laboratory with all of the latest analytical tools has been provided to make sure that all products shipped are as close to specifications as modern science can assure. This laboratory has been organized so that Sohio can supply the customer with service in their analytical and operating problems.

arator. This stream is passed through an exchanger and an ammonia refrigerated chiller to a separator where liquid ammonia drops out and is withdrawn as product. This ammonia removes with it water of saturation carried by the fresh feed portion of the gas. This is an essential purifying function for the ammonia synthesis feed since all oxygen compounds, including water vapor, are deleterious to the synthesis catalyst. The gas from the separator is heat exchanged against oil trap overhead for recovery of refrigeration. It then passes to the inlet of the synthesis converters.

Each of the twin converters consists of a high pressure shell containing a catalyst section and a heat exchanger. The catalyst section is a cylindrical shell which fits inside the pressure shell of the vessel, leaving an annulus between the two.

In the catalyst section are the catalyst beds. In order to maintain all the catalyst at an optimum temperature for maximum yield, provision is made to inject cold feed gas as quench in the space between the beds. The catalyst beds are arranged so that the top bed contains the smallest quantity of catalyst to limit the temperature rise before the first quench point. Since the temperature gradient is flatter in succeeding beds, the bed sizes are graduated with the largest bed at the bottom.

1. Edward F. Morrill, President. 2. Donald G. Stevens, Manager, Manufacturing Division. 3. Henry J. Coleman ,Manager, Sales Division. 4. Hubert H. Tucker, Agricultural Service Director. 5. Stephens B. Simon, Staff Assistant, Sales Division. 6. George L. McGuffey, Agricultural Salesman. 7. Russell I. Pisle, Agricultural Salesman. 8. James A. Kreglow, Agricultural Salesman. 9. Donald G. Miller, Agricultural Salesman.

Located beneath the catalyst section is the heat exchanger to preheat fresh inlet gas against hot reacted gas from the last catalyst bed. A by-pass tube runs through the center of the exchanger. This permits introduction of feed gas without preheating and provides temperature control to the top catalyst bed.

The normal point of entry for the feed is at the top of the converter. The gas flows downward between the pressure shell and the wall of the catalyst section. It serves as a cooling medium for the shell and is preheated prior to entering the exchanger. It enters the exchanger at the bottom of the converter and is preheated against hot effluent by circulating upward around exchanger tubes. For temperature control to the top bed, a portion of the feed gas may be introduced directly to the bottom of the converter where it bypasses the exchanger and meets the preheated feed. The combined stream passes into the central tube through the five catalyst beds and into the inlet of the first bed of catalyst. The gas passes downward through the catalyst with a rapid temperature rise as the ammonia reaction proceeds. It passes through a grid supporting the catalyst into a space between the first and second beds.

At this pont, the temperature is reduced and the ammonia content diluted by the injection of a portion of cold feed gas. This permits control throughout the catalyst beds to obtain temperatures for maximum yields. In like manner, the gas flows downward through the five beds of catalyst. In the presence of the iron oxide catalyst, a portion of the total hydrogen and nitrogen combines under suitable pressure and temperature to yield ammonia in the effluent from the last catalyst bed. The hot effluent passes through the exchanger, giving up heat to the incoming fresh feed. From the exchanger, it leaves the bottom of the converter, is cooled in an aircooled unit, and then cooled against cooling water. A major portion of the ammonia liquifies and is removed from the gas in a separator vessel. The separated gas passes to the suction of the recirculating compressors for recycle back to the converters. A portion of this gas is vented as continuous purge to control the concentration of methane and argon inerts. These components would otherwise build up in the system reducing the effective synthesis pressure which would be reflected in lower conversion per pass and production capacity.

180 TON NITRIC ACID UNIT

This plant, designed and built by The Chemical and Industrial Corp., burns ammonia and absorbs the oxides formed under pressure of approximately 100 psig.

In this unit, the mixture of air and ammonia enters a converter and burns in the presence of a platinum-rhodium catalyst. The resultant products of combustion, nitric oxide, vaporized water and nitrogen leave the converter through a heat exchanger and are cooled by heating, in turn, the exit gas stream to the expander turbine and the process air stream. Further cooling is carried out thereafter by passing the converted gas stream through a waste heat recovery boiler in which saturated steam under pressure is generated.

Cooling and oxidizing of the combustion gases, changing NO to NO_2, takes place in a multi-pass, horizontal, cascade-type cooler. The acid condensed in this cooler is delivered to the side of the absorbtion column at a point where the strength of the acid inside the tower most nearly corresponds to the strength of the condensate.

The uncondensed gases, primarily nitrogen, NO_2, and oxygen, enter the base of the bubble-plate absorption column and flow upward, countercurrent, to water (steam condensate) which is used as an absorbing medium. The acid made in the absorption column is swept by a stream of hot air and delivered to the storage tank by the pressure that exists in the column.

In the ammonium nitrate-ammonia solutions plant, urea tail gas and ammonia purge gas from the urea and ammonia plants are introduced into the neutralizer through submerged spargers. These gases supply approximately 80% of the ammonia gas required for neutrilization. The balance is pure anhydrous liquid ammonia. If the urea plant is not operating, 100% pure ammonia will be used for neutralization. Nitric acid is added through spargers directly above the ammonia spargers. The resulting heat of reaction concentrates the solution to approximately 83% ammonia nitrate. The water vapor from the neutralizer passes through an ammonia vaporizer (vaporizing incoming liquid ammonia), and then to a direct contact scrubber where it is condensed by cooling water. The effluent condensate and cooling water flows to the process sewer.

The 83% ammonium nitrate overflows from the neutralizer to an adjusting tank, in which liquid ammonia is added to adjust the ammonium nitrate from an acid condition to that of slightly alkaline; after this adjusting the liquid passes to rundown tank and is then pumped to storage and direct to the solution mixer.

Liquid anhydrous ammonia, 83% ammonium nitrate and water are fed into a baffled mixer, the proportions of which depend upon the desired ammoniated-ammonium nitrate solution required. The respective rates are controlled by automatic flow controllers, manually adjustable. The resultant heat of solution, which must be removed to prevent a too great rise in vapor pressure, is removed by a continuous recirculation of the mixer effluent stream through a shell and tube cooler at a sufficient rate to maintain the temperature and vapor pressure of the solution at a desired point.

UREA UNIT USES SWISS PROCESS

The 120-ton-per-day urea unit is the first to be built in the United States utilizing the secret Swiss Inventa process developed and production-tested by Holzverzuckerungs, A. G. (Hovag) of Ems, Switzerland, an affiliated company of Inventa, A. G. of Lucerne.

The Vulcan Engineering Division of The Vulcan Copper & Supply Company of Cincinnati, which holds the license and rights for the United States and Canada on the Inventa Process, is the prime contractor on this job, and Arthur G. McKee & Company, of Cleveland, are the constructors.

The process used in this urea unit is the culmination of years of research and development with more than six years of commercial operation in the production of crystalline urea of plastics and pharmaceutical grades. This process overcomes two major difficulties which have plagued urea production in the past: (1) extreme and rapid corrosion which takes place in the reactor where ammonia and carbon dioxide are combined under high temperature and pressure to form urea; (2) the difficulty of separating the unreacted carbon dioxide and ammonia which in this unit is overcome by the recycle system developed by Vulcan engineers.

Urea was the first organic chemical to be synthesized by man (Wohler, 1828). However, in the past the operation of producing a high-quality product was carried out only with considerable difficulty because of the corrosive nature of the material in the reactor.

The serious corrosion problems that attend commercial production of synthetic urea have been partially overcome in some installations through the use of either lead or silver linings for the reactor and other accessories.

Without use of lead or silver, the Hovag group selected materials for reactor construction and technique of reactor operation to combat corrosiveness. In the Sohio urea unit, the reactor is lined with the alloy developed by Hovag which should last from 10 to 15 years instead of requiring frequent replacement as has been the case with lead or silver.

Since the total output is uniformly high grade urea, complete flexibility of product is achieved.

Through these and other features, Sohio's new urea unit effects low operating cost, ease of operation, and greater reliability of continuous process.

Vulcan's translation of the Inventa process to American engineering design of new plants such as this Sohio urea unit is based on the very latest improvements available to the industry.

Plans for this new urea production unit were developed through the cooperative efforts of the engineers of Vulcan, Sohio, and Inventa. An accurate scale model was built as a guide for construction and for the training of the Sohio personnel who will operate the unit. Although certain features of the Inventa process are in the category of trade secrets, a brief description of the steps in the manufacture of pure crystalline urea from ammonia and carbon dioxide should be of considerable interest.

Liquid ammonia and gaseous carbon dioxide are fed to the urea synthesis reactor where they are subjected to high temperature and pressure. Under these conditions, two molecules of ammonia combine with one molecule of carbon dioxide to form ammonium carbamate, with the liberation of considerable heat in the process. About half of the ammonium carbamate then de-

Sackett Builds The Equipment You Need

★ **Continuous Granulating Units**

★ **Plant Modernization Programs**

★ **One Man Batch Weigh Systems**

★ **Mixing and Shipping Equipment**

Aerating Equipment
Automatic Control Equipment
Basing Units
Belt Conveyors
Bucket Elevators
Centralized Control Systems
Continuous Acidulating Processes
Continuous Ammoniating Systems
Conveyors
Coolers
Crushers
Disintegrators
Dry-Mixing Units
Dust-Arresting Equipment
Fume Scrubbing Systems
Hoppers and Spouts
Materials Handling Equipment
Milling and Screening Units
Multiple Hopper Batching Systems
Oil Fired Dryers
Plant Mechanization Systems
Pneumatically-Operated Gravity Batch Mixers
Pneumatically-Controlled Valves
Pulverizers
Sackett Timken Bearings
Sacking Units
Scales
Screens
Shipping Units
Shuttle Belt Conveying Systems
Tailing Mills
Vacuum Condensing Systems

GET THE RIGHT ANSWER TO YOUR PRODUCTION PROBLEMS *get Sackett*

SACKETT

THE A. J. SACKETT & SONS CO.
1727 S. HIGHLAND AVENUE
BALTIMORE 24, MARYLAND

hydrates to form urea and water, at the same time absorbing a small amount of heat. The net product leaving the reactor is a liquid mixture containing water, urea and carbamate.

This mixture undergoes a large reduction in pressure and is passed into the primary decomposer where most of the carbamate is decomposed to ammonia and carbon dioxide. After a further pressure reduction, the mixture flows to the secondary decomposer where practically all of the remaining carbamate is driven off. The carbamate-free solution of urea and water is concentrated in a vacuum evaporator and then pumped to the top of the prilling tower.

Prilling is simply a new name for the old process of making buckshot. But considerable scientific research and development has gone into the adaptation of the old shot-tower technique to the modern problem of prilling the urea melt to produce uniform sized particles of the material. The basis for the design and the operating know how for the prilling tower comes from Friedrich Uhde G.m.b.H. (Dortmund, Germany), as the result of their extensive experience with prilling towers in Europe for many years. The hot concentrated solution of urea is finely divided and the pellets dropped through a rising stream of cold air. During their fall, the pellets take a spherical shape and solidify, coming out the bottom in the form of small shot or prills. The prills are then dried, cooled, screened to remove over and under sized particles, and finally dusted with a conditioning agent to prevent caking and are then ready for bagging.

Tail gases from the decomposers, which contain ammonia, will usually be sent to the nitric acid and ammonia nitrate plants for ammonia recovery. However, separate recycle facilities are provided in the urea plant to recover ammonia when these other plants cannot handle all of the tail gases.

1955 Was Record Year For Sulphur Industry

Production and consumption of U. S. sulphur reached new records in 1955, increasing to an estimated 6,900,000 long tons, or 250,000 tons more than last year, while domestic consumption plus exports rose 400,000 tons to an estimated 7,100,000 tons.

Most of the new production came from the salt dome deposits of Louisiana and Texas mined by the Frasch hot water process. These mines—the major source of U. S. sulphur—produced an estimated 5,700,000 tons compared with 5,515,000 tons in 1954. Of the balance of the supply, 390,000 tons represented sulphur recovered from gases, 400,000 tons sulphur contained in pyrites, and 410,000 tons sulphur in various forms from other sources.

The increased supply of sulphur stems from a stepped-up expansion program begun some five years ago. Since mid-1951, seven new Frasch process mines have been placed in operation and numerous projects have been added to recover sulphur in various forms and from other sources including sour natural gas, refinery gases, smelter gas, pyrites and surface deposits. There now are 13 Frasch process mines being worked on the Gulf Coast of the U. S.

The largest producer was Boling dome of Texas Gulf Sulphur Co., followed by Freeport's Grande Ecaille and Garden Island Bay mines. Additional output came from smaller mines of Texas Gulf, Freeport, and the mines of Jefferson Lake Sulphur Co., Duval Sulphur and Potash Co., and Standard Sulphur Co.

Plans for development of one new sulphur deposit were announced during the year and exploratory drilling was conducted in several areas. A second known deposit, plans for the development of which have not yet been announced, is Block 18 of Humble Oil and Refining Co. The dome is some 6 miles off the Louisiana shore and under 40 feet of water.

A very happy, prosperous New Year to you

Our mail has been filled these past few weeks with heart-warming greetings from our readers and friends. If we could visit each of you to express our thanks for your cordial good wishes we would do so. But there are so many of you we must take this way of reciprocating your Holiday letters and cards . . . to wish that 1956 may be for you the best year ever.

SACKETT "TUNED TO THE TREND" ENGINEERING SPEEDS PRODUCTION OF

Granular MIXED GOODS

Whether you are planning to build a new plant for the production of granular mixed fertilizers or to convert your existing facilities for granular production, Sackett has exactly what you need in the way of know-how, process equipment and expert engineering and field management.

We are presently building Continuous Granulating Processes in 10, 15, 20, 30 and 40 ton per hour sizes. These capacities are based on a classified finished product.

We invite you to call us in for a consultation.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.

SACKETT BALTIMORE

America's Foremost Designers and Builders..

SUPERPHOSPHATE PLANTS · FERTILIZER MIXING PLANTS

RELATED PRODUCTION EQUIPMENT

THE A. J. SACKETT & SONS CO.,
1727 S. HIGHLAND AVENUE BALTIMORE 24, MD.

Architects and Manufacturing Engineers to the Fertilizer Industry since 1894

THE FERTILIZER INDUSTRY IS
CORDIALLY INVITED TO
OPEN HOUSE JANUARY 27
BY
FARM SERVICE, INC. AND DAVIDSON-KENNEDY
AT **OPELOUSAS, LOUISIANA**

Upper left: Overall view shows acidulation plant with housing for chemical mixer in right foreground, storage building in background. Plant is owned by Anthony Chemicals, Inc. of Opelousas, La. **Upper right:** Cone mixer on platform is heart of the unit, mixes sulfuric acid and water with phosphate rock dust. **Lower left:** Dr. Warner Anthony, one of plant's owners, regulates weigh-belt feeder. **Lower right:** Plant Foreman Edius Hebert sets controls on water and acid valves. Mixture utilizes 75% of acid meter output, 14% of water meter output.

The industry has been invited to attend an open house at the new Farm Service, Inc. plant in Opelousas, La. January 27. The event is being sponsored jointly by Farm Service, Inc. and Davidson-Kennedy Company, Atlanta, who furnished the complete continuous acidulation plant and equipment. A new, inexpensive method of producing superphosphate will be demonstrated.

Because of the plant investment required, the superphosphate industry has formerly been confined to larger producers. Now by incorporating the new TVA funnel mixer with the continuous den, all the equipment required to manufacture normal super can be obtained for about $30,000, according to A. T. Kennedy, Davidson - Kennedy Co. president. "Operating costs are comparably low," Mr. Kennedy pointed out. "Two men can operate this plant at the continuous rate of 20 tons per hour." Enriched superphosphate can be made with this same equipment by adding mozzles to the cone mixer, a rotometer for phosphoric acid and the necessary piping to the phosphoric acid supply.

At the Opelousas plant, the ground rock dust is brought to the plant site in hopper cars. It is unloaded either into the rock storage hopper or directly from the car for manufacturing. Te dust is conveyed from the car through a feeder screw conveyor to the bucket elevator which elevates the dust to the surge hopper. When the surge hopper is full, the overflow goes back into the storage hopper. From the surge hopper, the dust is regulated by a variable speed screw feeder to keep a constant weight on the belt feeder. Ground rock goes directly from the belt feeder into the cone mixer.

Acid and water, fed to the cone mixer, mix with the dust and discharge directly onto the pan type conveyor den. The freshly mixed superphosphate is retained in the den for at least fifty minutes to allow it to set up sufficiently before reaching the cutter. After leaving the den, the material is discharged onto an inclined belt conveyor and conveyed to storage.

A very porous superphosphate is obtained through this process with better ammoniation than is possible with pug mill operation, say the designers, and no acid cutting equipment is required since high concentration acid is cut directly into the cone mixer. An actual sample of green superphosphate taken recently at the den, in the Opelousas plant, indicates curing will be completed in a week to 10 days.

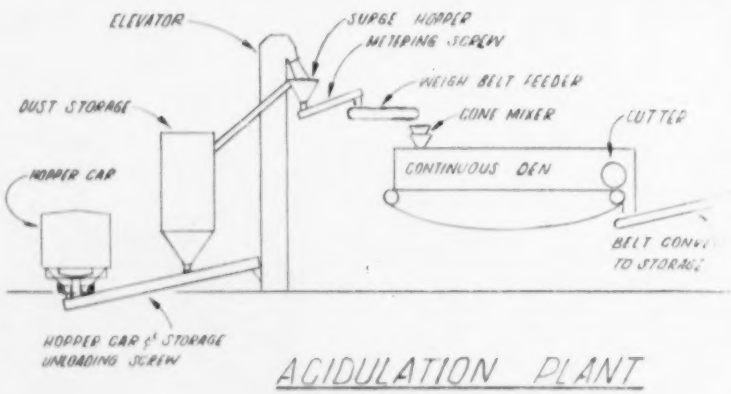
The green superphosphate sample taken at the den showed the following content:

MOISTURE	9.36%
T. P. A.	20.88%
INSOLUBLES	1.37%
A. P. A.	19.51%
FREE ACID	3.18%

Principal difference between the Farm Service superphosphate unit and other continuous super plants is that the material is discharged directly from the cone mixer into the den at the Opelousas installation.

The new unit is located adjacent to the already-existing mixing plant owned by Farm Service. Officers of the company are: J. W. Anthony, president; John Wood Anthony and W. H. Anthony, vice presidents; and E. B. Anthony, secretary-treasurer. Allen Richard is plant manager.

Dr. Warner Anthony says he expects a large gathering for the open house. Arrangements have been made to meet incoming airlines at nearby LaFayette, La. and accommodations for several hundred guests have been reserved.



ACIDULATION PLANT
FLOW SHEET

Northwest Nitro Will Use St. Gobain Process

Chemical fertilizers will be mass-produced in the United States and Canada for the first time under advanced French processes licensed by Compagnie de Saint-Gobain of Paris, which dates back to 1665. This announcement was made by Rene Grandgeorge, general manager, who said, "The process is one of many new scientific developments characteristic of post-war advancement in the French chemical industry."

As our readers know, a plant costing $22 million dollars will be completed at Medicine Hat, Alberta, next year to manufacture under Saint-Gobain license, using a phosphoric acid process owned jointly by that firm and Union Chimique Belge of Brussells.

The process will be used by Northwest Nitro-Chemicals, Ltd., controlled by Commercial Solvents Corp. Associated in this venture, as we have reported previously, will be New British Dominion Oil Co., Ltd., Ford, Bacon & Davis, Inc., and Frank McMahon of Alberta.

First use of the new products will be in the agricultural areas of the prairie provinces of Canada, and in the northwestern United States. Harrisons and Crossfield (Canada) Ltd. has been named exclusive sales agent.

Compagnie de Saint-Gobain is the direct owner of 32 factories and is interested in 60 others through subsidiaries and associated firms. It employs 40,000 persons, directly or indirectly, and is one of France's ten top industries.

Du Pont $900,000 Education Grants

A fund of more than $900,000 for grants to over 100 universities and colleges in its annual program of aid to education was announced Dec. 16 by the Du Pont Company. This support, which is for the next academic year, is a substantial increase over the $800,000 in gifts made for 1955.

Dorr-Oliver And Long Combine Canadian Operations

J. D. Hitch, Jr., President of Dorr-Oliver Incorporated of Stamford, Conn. recently announced plans for the integration of the Canadian operations of Dorr-Oliver with those of E. Long Limited of Orillia, Ontario, on January 1, 1956. The new organization will be known as Dorr-Oliver-Long Limited.

Clarence R. Long, presently a Director of Dorr-Oliver, Inc., and President of E. Long Ltd. will be the President of the enlarged organization. Headquarters will be located in Orillia with the former Toronto office of Dorr-Oliver and the Vancouver office of E. Long operating as divisional sales offices.

The result of several months of careful study, the action is the culmination of an extremely close relationship between the companies over the years. The Orillia shops of E. Long have manufactured Dorr equipment since 1911, Oliver equipment since 1930, and E. Long has, in addition, represented Oliver on a sales basis since 1940.

The expanded organization is expected to greatly strengthen overall operations.

Union Special Celebrates Diamond Jubilee

In 1956, throughout the world, members of the Union Special Machine Company organization are celebrating the Diamond Jubilee Anniversary of the company's founding.

The firm was started in 1881 in Chicago, Illinois, as the Union Bag Company, by three men whose ideas were destined to revolutionize the sewing industry. William Stanley North, Jasper W. Corey, and Lorenz Muther organized the first company exclusively devoted to the building of specially designed industrial sewing machines that would do a single type of work in the most efficient manner possible.

From the very beginning 75 years ago, Union Special has contributed immensely to the growth and development of the sewing industry in a number of ways. The company pioneered in changing sewing room methods by sectionalizing the work, it introduced standard seam construction for many garments to insure uniformity, and through the years it provided the industry with up-to-the-minute, high speed machines for all sewing operations.

Union Special Machine Company also has the distinction of being the originator of filled bag closing machines which have led to the almost universal use of machine-sewed closures for bags in place of hand sewing. The first filled bag closing machine, in Class 11600, was introduced in 1896. Union Special's present line of bag closing machines includes many different types and styles for all branches of industry.

Raymond Will Operate As Albermarle Subsidiary

With reference to announcement made last month, The Raymond Bag Company of Middletown, Ohio, will operate as a wholly owned subsidiary of The Albemarle Paper Manufacturing Company of Richmond, Virginia. Raymond, manufacturers of Multiwall paper shipping sacks, will retain its identity and the present personnel will remain intact.

According to W. F. Lawrence, board chairman, and C. L. Mers, president of Raymond, the purpose of this change was to make Raymond a part of an integrated operation.

CALIFORNIA

Sheli Chemical's Ammonia division vice-president **G. R. Monkhouse** has issued a joint statement with **Paul Greening,** announcing that with Mr. Greening's retirement as a distributor of Shell ammonia as of the end of 1955, the 19 Greening ammonia agents will become direct agents, in all other respects operating as in the past. They serve such important farming areas as the San Joaquin, Salinas, Coastal and Imperial valleys. Of Shell's two big ammonia plants in California, the Ventura plant was built primarily to serve the **Greening-Smith Company.** Mr. Greening will continue as a Shell consultant.

* * *

California Spray Chemical and **Agricultural Ammonia Service, Inc.** have concluded a new marketing agreement which makes Agri-Serv the sole authorized distributor of Calspray's Ortho NH_3 throughout the San Joaquin Valley and the coastal counties of Los Angeles, Ventura and Santa Barbara.

Ammonia from Calspray's $16,000,000 fertilizer plant at Richmond will be moved to the farmer through Agri-Serv's facilities, which will be more than doubled for the purpose, and Agri-Serv will increase its staff of consulting, service and application personnel. The Agri-Serv-developed self-application equipment will be available to farmers in the area to be served.

The announcement of the new arrangement was made jointly by Calspray president **A. W. Mohr** and Agri-Serv's vice-president and general manager, **Fred M. Stewart.**

* * *

American Potash & Chemical has made two announcements: A new facility for production of technical parathion at their Eston Chemical Plant at Los Angeles, to be ready early this year. The purchase of 100% of the stock of **Western Electrochemical** at Henderson, Nevada. This plant produces ammonium and potassium perchlorate, sodium and potassium chlorate and maganese dioxide, which will be sold under the Trona brand. It has been renamed **American Potash & Chemical Corporation (Nevada).**

* * *

Chemical Fertilizer Company's new plant at Arbuckle, recently put into operation with a "grand opening", has a capacity of 600 daily tons of aqua ammonia and 200 of liquid mix.

COLORADO

Mineral Aggregates Corp., has been formed by Denver people to process and market as "Mineralag" a mineral ore found near Salida which contains about 37% sulfate, 26% calcium, with traces of magnesium, potassium, phosphorous, free sulphur and nitrogen in a compound that is 92% water-soluble. **C. George Swallow** is president; **W. Ross Keyte,** vice-president; **Cy Krause,** secretary. The produce is coming on the market early next month.

FLORIDA

Escambia Bay Chemical's new plant at Pensacola should be in production with anhydrous ammonia this month, with **Chemico** pushing the nitric and ammonia units.

* * *

American Cyanamid has announced plans for a 200,000 annual ton triple superphosphate plant at Brewster, designed by **Chemico** in collaboration with **Dorr-Oliver.**

IDAHO

Potash Company of America is planning an exploratory mining tunnel in Bear Lake County, hunting phosphate deposits.

ILLINOIS

Federal Chemical, Louisville, Ky. are building a 10,000 square food warehouse and office building at 4712 S. Adams St., Peoria for wholesale distribution. **Wayne C. Bloodworth,** who has been with Federal for 17 years will be manager, and says the plant will be ready by the middle of this month to serve 35 counties in central Illinois.

U. S. Industrial Chemicals Co., division of National Distillers Products Corporation will build a new plant at Tuscola to produce wet-process phosphoric acid, it was announced by **Dr. R. E. Hulse,** vice president.

Annual production capacity will be 60,000 tons of 75% phosphoric acid, produced from sulfuric acid and phosphate rock by a process developed by the **S. A. Metallurgique de Prayon,** a Belgian company. **Singmaster and Breyer** will engineer and construct the plant, which is expected to start operating at the end of 1956.

U.S.I. already produces sulfuric acid, ammonia and nitrogen solutions at Tuscola.

INDIANA

Tab Grain Co., Tab, are completing a new plant to produce 24 hourly tons on equipment designed and built by **Stedman Machinery & Foundry. Kenneth** and **Dorothea Miller,** owners, will produce their own ammoniated superphosphate and do custom mixing.

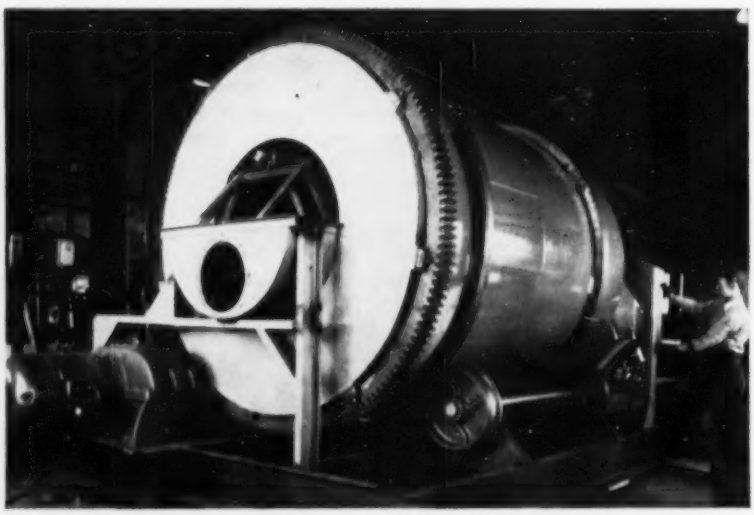
KANSAS

Kaw Fertilizer Service, Prairie Village, has been established by **Dean McHard, James E. Adams** and **Carl W. Jackson.**

KENTUCKY

North American Fertilizer Co.'s building at Louisville was entered and their night watchman beaten to death December 2, but efforts to open the safe were not successful.

Finishing touches are here being put on the ammoniator for the Kingsbury plant at Peru, Indiana. Part of the Weatherly granulating unit now being installed, it is a 7' by 10' continuous TVA type ammoniator. The entire installation was designed by The D. M. Weatherly Company, Atlanta, Ga.



Around the Map

This new modern chemical research center for Spencer Chemical Company will be erected southwest of Kansas City. The center should be completed by the Spring of 1957 at which time it will be devoted to the research and development of new and improved products in the general fields of industrial and agricultural chemicals and plastics.

Kenneth A. Spencer, president of the Company, indicated that the center, on a 40 acre site, will initially house 100 to 125 people who will be under the direction of Dr. John R. Brown, Jr., Managing Director of Research and Development. About half of these people will be professionally trained chemists and engineers, and the balance technicians and clerical help.

MAINE

Northern Chemical Industries' new Searsport plant will bring $1,000,000 into Maine annually when it opens in April, according to **James E. Totman,** president.

MINNESOTA

Rochester Fertilizer Co., Rochester, showed its new plant, a $150,000 project, reported here in November, to forty-five area fertilizer dealers and then entertained them at a dinner.

MISSOURI

Semo Liquid Fertilizer Co. has been formed at Charleston with **Dee C. Jennings** as general manager. Local capital is financing the operation.

NEBRASKA

Holdrege Seed and Farm Supply, Holdrege, expect to be in production by mid-March with their new liquid fertilizer plant, according to president Clay Westcott. Equipment is being installed, to produce 40 to 50 daily tons.

NEW YORK

Virginia-Carolina's new plant at Rochester is due to be under way as you read this. Located on the site of the warehouse they established there in the early 30's, it will mix and bag, with **Hugh M. Griffith** as superintendent. **John J. Mulroney** —"Mister V-C" who has sold their fertilizer in Western New York since 1914, will be there to see a 40-year dream realized. **E. Earle Lacy** will head the sales unit at the new plant.

* * *

Young and Mazura Produce, Riverhead, has been formed with $20,000 capital to produce fertilizers and insecticides.

* * *

Coastland Chemical Corp. has been chartered. Address C/O John M. Keating 41 E. 42d St., New York 17.

OHIO

The Ohio Equity Exchange Company of Lima is building a fertilizer manufacturing plant at Crestline. According to Hubert B. Calvelage, treasurer, the plant will have a storage capacity of 5,000 tons. Bagging and shipping will be in a separate building along with storage space for bagged product.

A Weatherly Controlled-Granulation Unit to manufacture 20 tons per hour of closely sized product is included. Construction was started the early part of December.

The plant is being designed by **The D. M. Weatherly Company** of Atlanta, Georgia.

* * *

Clinton County Farm Bureau Cooperative is establishing at Wilmington a $50,000 bulk distribution plant.

OKLAHOMA

Ozark-Mahoning Company, Tulsa, will build an ammonia phosphate fertilizer plant there at a cost to exceed $1,000,000, it was announced Dec. 11 by **C. O. Anderson,** president. The new facilities will adjoin the existing plants which the company operates in West Tulsa. The new plant will have a capacity to produce about 50,000 tons per year of high analysis water soluble complex fertilizers.

Ozark-Mahoning Company has been producing sulphuric acid in Tulsa for over thirty years, and will utilize large quantities in the new plant, which will embody the latest developments in the production of phosphoric acid and granulated fertilizer. One of the most interesting pieces of equipment in the plant will be a Submerged Combustion evaporator used in concentrating the phosphoric acid before treatment in the fertilizer plant. It is an underwater gas burner in which the flame actually impinges on the solution and operates submerged in the acid. This is an Ozark-Mahoning invention which has been used successfully for many years in their plant at Monahans, Texas. Hot acid solutions are extremely corrosive and very difficult to concentrate. The Submerged Combustion burner is made of graphite and is an excellent means of concentrating acid. The plant also will be equipped with the most modern of scrubbing devices so that there will be no emission of dust or obnoxious fumes, which sometimes are associated with chemical and fertilizer plants.

Singmaster and Breyer, New York, are designing the phosphoric acid plant. Design of the fertilizer plant and construction will be handled by the company's own forces.

Ozark-Mahoning Company expects to set up its own sales organization to cover the middle-west and southwest and will market its product under its own trade name. **C. T. Longaker** has joined Ozark-Mahoning as director of sales for the new fertilizer department.

PENNSYLVANIA

McKeesport is under way with its garbage disposal fertilizer plant, built on the bacteriological process controlled by **Organic Corporation of America** and by **H. G. Burr,** Pittsburgh engineering concern.

* * *

Miller Chemical and Fertilizer, Baltimore, are said to be hunting a site in Lancaster County for a plant

WECCO
JOINS THE TRONA® FAMILY
AMERICAN POTASH & CHEMICAL CORP. (NEVADA)
Formerly Western Electrochemical Co., Henderson, Nev.

Electrochemicals of the Highest Quality

- **CHLORATES**
  Sodium and Potassium
- **PERCHLORATES**
  Ammonium and Potassium
- **MANGANESE DIOXIDE**
  Electrolytic Grade

SAN ANTONIO, TEXAS

Another plant, another picture, another step in Trona's continuing expansion program in the Chemical Industry. With the acquisition of the former Western Electrochemical Company of Henderson, Nevada, American Potash diversifies into the electrochemicals field with ammonium and potassium perchlorate for aviation and guided missiles; sodium chlorate for pulp (kraft) bleaches, weed killers and defoliants; potassium chlorate for matches, flares and fireworks; and maganese dioxide for military communications and hearing aids. The addition of the Henderson operation, henceforth to be known as American Potash and Chemical Corporation (Nevada), as a partner-in-progress with the new lithium hydroxide plant of American Lithium Chemicals, Incorporated, San Antonio, Tex. gives added impact to Trona's diversification program in chemicals vital to Industry and Agriculture.

American Potash & Chemical Corporation

TRONA

INDUSTRIAL & AGRICULTURAL CHEMICALS

Offices • 3030 West Sixth Street, Los Angeles 54, California
• 99 Park Avenue, New York 16, New York
• 214 Walton Building, Atlanta 3, Georgia
Plants • Trona and Los Angeles, California
• San Antonio, Texas; Henderson, Nevada
Export Division • 99 Park Avenue, New York 16, New York

PRODUCERS OF | **BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM BROMINE • CHLORATES • PERCHLORATES • MANGANESE DIOXIDE** and a diversified line of specialized agricultural and refrigerant chemicals.

which will employ 25-35, and which will add to the string of such plants they operate in Maryland.

RHODE ISLAND

Nitroform Agricultural Chemicals, Woonsocket, a division of Woonsocket Color & Chemical, have announced "Nitroform", a 38% urea-form nitrogen which is designed to give up its nitrogen for plant growth at a rate approximately equalling the growing season—24 to 30 weeks depending on irrigation and temperature. It is especially recommended for crops with a long growth period, such as lawns, tomatoes, corn, broccoli, fruit trees, and in greenhouses.

SOUTH DAKOTA

Dakota Fertilizer Company, Canton, has acquired a building, a one ton **Worthington** mixer with ammoniation equipment and other equipment for a plant to serve a trade area in South Dakota, Iowa and Minnesota, writes **N. Andy Anderson,** owner, who expects to be in operation for the Spring season.

TEXAS

Central Texas Fertilizer Company, Comanche, suffered an explosion, the result of natural gas forming beneath the office floor, which was fatal to a plant worker, Carroll Anderson, and fatally injured the office manager, Claudia Fisher, but did little plant damage. The office building and equipment were demolished by the blast, which tore down 2-foot stone walls, ripped off the roof and left the floor in splinters. Both Anderson and Miss Fisher were blown into the street.

* * *

Hub Fertilizer has opened Friona quarters to handle anhydrous ammonia, with S. T. Thornton as manager.

UTAH

U. S. Steel's plant at Geneva Works in the Utah Valley, which will cost $18,000,000 is the first to be built by any steel plant. US Steel's **Charles W. Baldwin,** speaking recently at a Provo banquet said it is the first to produce anhydrous ammonia from coke oven gas. It will have a capacity of 200 daily tons, and employ 270. 300 local citizens heard him.

* * *

Alunite Corporation of America, is operating its crushing mill at Marysvale, blending with nitrogenous material at Midvale and packaging for sale as a fertilizer and conditioner this mineral-rich alunite rock, according to **G. Owen Lovejoy,** president.

ALGERIA

Bouzarea Observatory, Algiers will attempt to create fertilizer ingredients by the oxidation of atmospheric nitrogen. A huge solar furnace is being constructed which follows the sun with its 27 foot parabolic mirror. A heat of 3,000 degrees centigrade is obtained by a similar furnace in the Pyrenees.

AUSTRALIA

British Petroleum has started a 60,000 daily barrel refinery at Kwinana that is heralded as the beginning of a petrochemicals industry in that continent.

Gilman Paper Company's pulp and paper-making subsidiary—St. Marys Kraft Corporation—now has two paper machines operating at St. Marys, Georgia, rounding out a program of expansion in the production of both bleached and unbleached kraft papers.

The No. 2 Machine is housed in a new brick building, built especially for its installation, parallel and adjacent to the building that houses the No. 1 Paper Machine.

The Company only a year ago completed a modern bleach plant on the premises, considered one of the most advanced sulphate pulp bleach plants in existence today. The modern pulp mill has also undergone improvements and extensions to increase its quality and capacity.

Another project rapidly nearing completion at St. Marys is a new quality-control laboratory and research center to function on all paper manufacturing at this fully integrated mill and to develop new, improved bleached kraft board for packaging food and other products.

INDIA

The Government is considering a plant in the Bhakra-Nagal area to produce 200,000 annual tons of ammonium nitrate. **K. C. Sharma,** until recently with **Sindri,** has been made Deputy Project Officer, and a member of the committee of technical experts set up to study the project.

ISRAEL

Fertilizers and Chemicals Ltd., Haifa will refine ammonia from the natural gas of the Heletz oil well.

JAPAN

Japanese Natural Gas Co. and **Chemico** have concluded a patent agreement under which urea will start coming from natural gas some time in 1957. JNG is to be capitalized at $750,000 and expect to produce 2400 monthly tons at the start of operations.

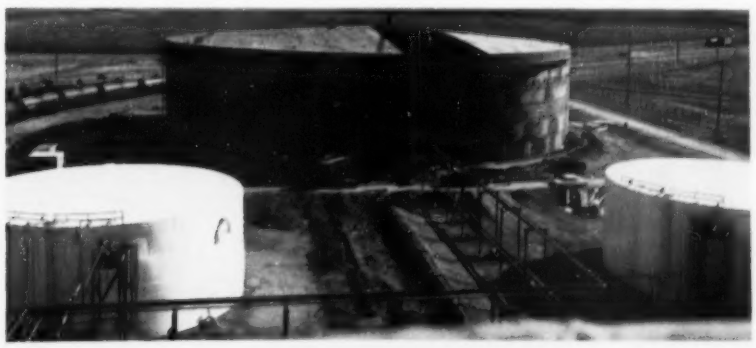
NORWAY

Norsk Hydro, first in the world to produce fertilizers from air and water, and now the largest enterprise in Norway, celebrated their 50th anniversary last month.

TURKEY

Consumption of chemical fertilizers has risen from 45,000 tons in 1951 to a current rate of 600,000 annual tons, as the result of a major educational program. The nitrogen plant recently begun at Kutahya, and due to be ready in 1958 will produce 110,000 annual tons and efforts are being made now to double its capacity. The supershopshate plant at Iskenderun has been built and will produce 110,000 annual tons. New sulphuric installations are being erected at the **Etibank's** Murgal plant.

Construction nears completion on a 323,000-barrel aqua ammonia storage tank, one of the largest steel tanks in the world, adjacent to Phillips Chemical Company's Cactus plant near Etter in the Texas Panhandle. Such storage of aqua ammonia helps Phillips to provide customers adequate supplies when needed for seasonal Spring and Fall soil application. The huge tank, covering nearly an acre of ground, is 48 feet high and 220 feet across.



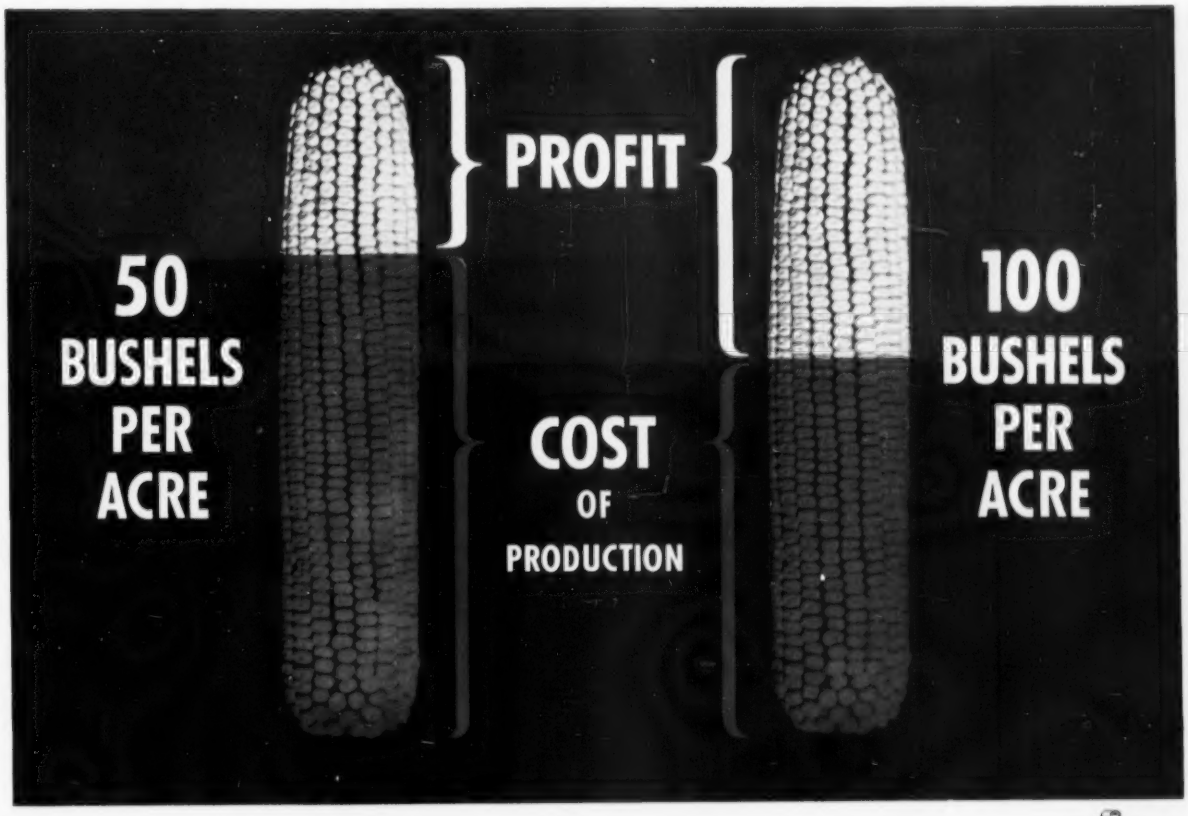
Again we tell 3½ million farmers

Fertilizer Grows Farm Profits

The advertisement on the opposite page is the second in a series in a powerful and continuing campaign directed to the attention of more than 3½ MILLION readers of farm magazines.

Nitrogen Division, Allied Chemical & Dye Corporation, is conducting this campaign to serve the best interests of the farmer, the fertilizer manufacturer, the county agent, the country banker, the experiment station, the extension service and all others interested in a profitable agriculture.

This campaign is designed to be helpful to you in your efforts to serve the farmer. We trust that it meets with your approval and we greatly appreciate any comments or suggestions you may wish to send us.



MORE FERTILIZER MEANS MORE PROFIT PER EAR

More fertilizer per acre means more bushels per acre added to your yield at very low extra cost. This reduces your cost of production per ear or per bushel and increases your net profit.

For example the corn ears pictured above show how fertilizer worked for some typical corn growers on good land. Fixed expenses, such as land-use, management, labor and machinery were the same whether the yield was 50 bushels or 100 bushels per acre.

To increase the yield to 100 bushels the only extra investment required was MORE FERTILIZER per acre, more seed for closer spacing and extra labor for harvesting the larger yield. Fifty extra bushels per acre were added to the yield at very low extra cost and far greater profit per bushel.

More fertilizer per acre is your best-paying investment. Results vary on different crops and soils but the basic economic fact prevails: a bushel or a pound of any crop can be produced much more economically when the yield is high than when the yield is low. More fertilizer is the direct route to high yields.

The price of fertilizer has not gone up like the prices of many other things the farmer buys. Returns from thousands of tests show that $1 invested in fertilizer produces an average return of $3.75 in extra yields. On many crops the return is much higher.

Fertilizer is your best investment. Fertilizer reduces your cost of production per bushel and increases your net profit. Use more fertilizer this year!

See Your County Agent

Ask your County Agent to recommend the analyses and the amounts of fertilizers best suited to produce big yields of the crops you grow on your soil. His advice to you is based on the latest official recommendations from your Extension Service and Experiment Station.

See Your Banker

Bankers are alert to good investments. They know that fertilizer pays a big return in the short period of a growing season. If you need money to buy more fertilizer, most bankers consider the extra yields produced by fertilizer as an excellent risk.

See Your Dealer

Your fertilizer dealer can supply you with a good brand of fertilizer in the amounts and analyses as recommended by your County Agent. Help your dealer to get your fertilizer to you on time by placing your order early and accepting prompt delivery. Use more fertilizer than ever before and have it on hand when you need it. Remember, fertilizer grows farm profits. Use enough to really pay you big!

The fertilizer industry serves the farmer. Nitrogen Division serves the fertilizer industry as America's leading supplier of nitrogen for use in mixed fertilizers.

NITROGEN DIVISION Allied Chemical & Dye Corporation
New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio
Omaha 7, Neb. • Indianapolis 20, Ind. • Columbia 1, S. C.
Atlanta 3, Ga. • Kalamazoo, Mich. • Columbia, Mo.

Fertilizer Grows Farm Profits

CF Staff–Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by COMMERCIAL FERTILIZER Staff

	November		October		September	July-Aug.-Sept. Quarter		January thru June		July thru December		Year (July-June)	
State	1955	1954	1955	1954	1955	1955	1954	1955	1954	1954	1953	1954-55	1953-54
Alabama	37,576	68,326	52,339	94,688	29,734	61,996	77,244	844,071	924,968	267,041	147,702	1,114,238	1,074,892
Arkansas	5,836	9,583	13,716	16,471	16,856	33,562	22,882	270,894	313,787	59,887	52,438	330,776	366,225
Georgia	70,201	61,457	35,346	36,258	13,340	80,739	63,391	1,047,875	1,147,157	225,083	218,027	1,273,445	1,361,254
Kentucky	8,287	9,395	34,965	29,672	17,130	33,388	35,778	433,102	489,024	91,386	88,905	524,488	577,929
Louisiana	14,062	16,780	15,019	24,535	12,007	22,849	25,153	1,047,875	250,747	78,067	74,471	310,848	325,218
Missouri	30,272	15,836	115,485	83,927	105,139	164,002	147,678	394,979	500,020	268,257	256,427	682,690	756,457
N. Carolina		47,294[1]	74,504	80,948	34,182	62,174	71,387	1,566,158	1,558,472	264,475	257,100	1,830,633	1,815,572
Oklahoma	3,876	4,080	23,619	21,914	27,295	40,347	30,201	63,799	72,809	58,406	71,558	122,205	144,367
S. Carolina	26,346	35,789	27,987	25,780	18,134	52,710	40,477	791,206	752,639	132,604	183,919	928,715	936,558
Tennessee	40,044	54,382	31,494	53,127	21,441	59,120	52,612	282,462	405,756	167,383	107,544	523,349	523,303
Texas	30,227	34,142	58,596	87,711	42,850	76,141	63,080	371,587	374,309	212,885	186,097	584,269	560,381
California	(reports submitted quarterly)					173,411	141,875	603,857	513,300	318,270	317,270	922,127	830,327
Virginia	(reports submitted quarterly)					71,064	77,959	636,585	620,261	159,185	160,715	795,770	780,931
Indiana	(reports submitted semi-annually)							873,966	896,104	284,994	283,987	1,158,960	1,180,091
New Jersey	(reports submitted semi-annually)								231,686[1]	53,830	57,923		289,614[1]
Washington	(reports submitted semi-annually)							124,186	101,779	58,162[1]	*	182,348[1]	*
TOTAL	266,727	309,770	483,070	555,031	338,108	931,503	849,717	8,537,508	8,921,132	2,641,753	2,464,088	11,102,613	11,233,505

(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with same period of current year.

MARKETS

ORGANICS: Interest in organics for spot shipment and for movement over the next few months particularly, is good and most producers of Nitrogenous Tankage are in a heavily sold position at prices varying from $4.00 to $4.60 per unit of Ammonia, f.o.b. production points. Sewage Sludge, depending on production point, is normal at $2.95 per unit of Ammonia and 50¢ per unit of APA to $3.00 per unit of Nitrogen and 40¢ per unit of APA, bulk, f.o.b. shipping point. Feather Tankage has advanced in price sharply in the last few weeks and current offerings, when available, are around $4.75 to $5.00 per unit of Ammonia, bulk, delivered in the Southeast.

CASTOR POMACE: Limited supplies of Domestic production are available at $40.00 per ton, in bags, f.o.b. Northeastern production points for shipment over the next 90 days.

DRIED BLOOD: Unground blood is indicated at around $5.25 to $5.50 per unit of Ammonia, in bags, in the Chicago area and around $5.00 nominally in the New York area.

POTASH: Demand continues in seasonal dimensions and no change in prices is reported.

GROUND COTTON BUR ASH: Demand continues excellent for this source of Potash which is primarily in the form of Carbonate of Potash. Supplies are taken up through the end of this year but are available for shipment January through June. Current analyses vary from 38 to 42% K2O which makes for a delivered cost approximating that of Domestic Sulphate of Potash.

PHOSPHATE ROCK: Export demand has fallen off sharply on account of high transportation costs to Europe. Supplies continue adequate for domestic use and demand fair.

SUPERPHOSPHATE: Demand is in good volume and stocks are comfortable. Some producers report a sold up position for the season.

NITRATE OF SODA: Stocks continue to be augmented at the ports in preparation for the increasing demand expected around the turn of the year. No change in prices is indicated.

SULPHATE OF AMMONIA: Stocks of coke-oven Sulphate of Ammonia are in uncomfortably long positions. Synthetic Sulphate of Ammonia in the Gulf and West Coast regions is well sold up and position on that type is in good balance.

GENERAL: Activity in mixed fertilizers is quite strong in the Florida area but demand is relatively light in other areas. After the turn of the year movement is expected to increase sharply.

A brochure descriptive of the Kraft Bag Corporation's Kraftpacker open mouth filling machine shown here is available to our readers on request to them at 630 Fifth Avenue, New York 20, or Daily news Building, Chicago 6.

Hough Names New Distributors

The Frank G. Hough Co. of Libertyville, Illinois, announces the appointment of new distributors and the assignment of additional territory to some of their present distributors. These companies, which are authorized and equipped to handle the sales, service and parts business on the complete lines of "Payloader" tractor-shovels and "Payloader" tractors, are as follows:

Phillippi Equipment Co. for the state of Minnesota, with headquarters in Minneapolis and branches in Duluth, Hibbing and Morehead, Minnesota.

Rish Equipment Co. now serves the entire state of Ohio, with plants in Cleveland, Columbus, Dayton, Toledo, Cincinnati and Portsmouth.

J. D. Evans Equipment Company has the entire state of South Dakota. Their headquarters is in Sioux Falls, with a branch in Rapid City.

Brandeis Machinery & Supply Corp. has added territory in Southern Illinois, which they are serving from their new plant in Mt. Vernon, Illinois.

State Equipment Co. has been granted the state of Vermont territory which they are serving out of Montpelier.

Orton Equipment Co. is the new Hough Distributor at Stratford, California.

Pin-hole perforations are helping us fill our Multiwalls faster

A CHEMICAL COMPANY packing a highly aerated hygroscopic material ran into a snag: filling speeds were slow because trapped air could not escape through the Multiwall's asphalt-laminated ply.

A Union packaging specialist came up with the answer—special perforations. The tiny vents allowed the air to escape without affecting the strength of the bags, the moisture vapor protection of the barrier ply, or allowing material to blow out.

This simple change greatly increased the packer's filling speed and, in doing so, reduced his packaging costs.

Talk with Union about your Multiwall bagging operation. Perhaps Union Multiwalls and Union Multiwall Packaging Machinery can make your packaging dollar stretch still further.

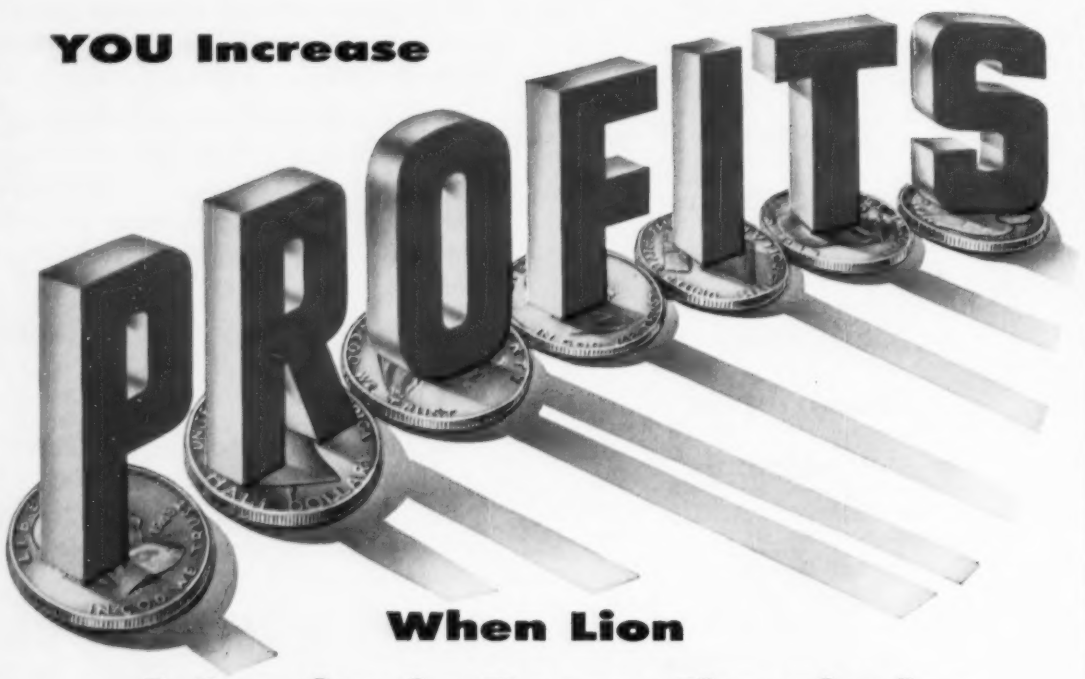
UNION MULTIWALL BAGS

WHEN YOU GET DOWN TO CASES, UNION SHOWS THE WAY

UNION BAG & PAPER CORPORATION

WOOLWORTH BUILDING, NEW YORK 7, N. Y.

YOU Increase



When Lion

- A Leader in Petro-Chemicals -

Supplies Your NITROGEN NEEDS

HERE'S THE LION LINE-UP OF QUALITY NITROGEN FERTILIZER MATERIALS

Lion Anhydrous Ammonia—82.2% nitrogen. Quality guaranteed.

Lion Aqua Ammonia—Ammonia content about 30%—other grades to suit your requirements.

Lion Ammonium Nitrate Fertilizer—Improved spherical pellets. Guaranteed 33.5% nitrogen.

Lion Nitrogen Fertilizer Solutions—Various types to suit your particular manufacturing needs.

Lion Sulphate of Ammonia—White, uniform, free flowing crystals. Guaranteed 21% nitrogen.

Now that the new fertilizer manufacturing season is in full swing, make sure you realize all the profits your plant can produce. *Where you buy* your raw materials can be vital and now, more than ever before, it pays to buy *your nitrogen needs* from Lion—a leader!

Lion nitrogen products are manufactured under rigid controls to meet exacting specifications—ending the costly production delays that result when ingredients vary in quality from day to day. With Lion products, you produce with maximum efficiency and profit—and you maintain the quality standards your customers demand.

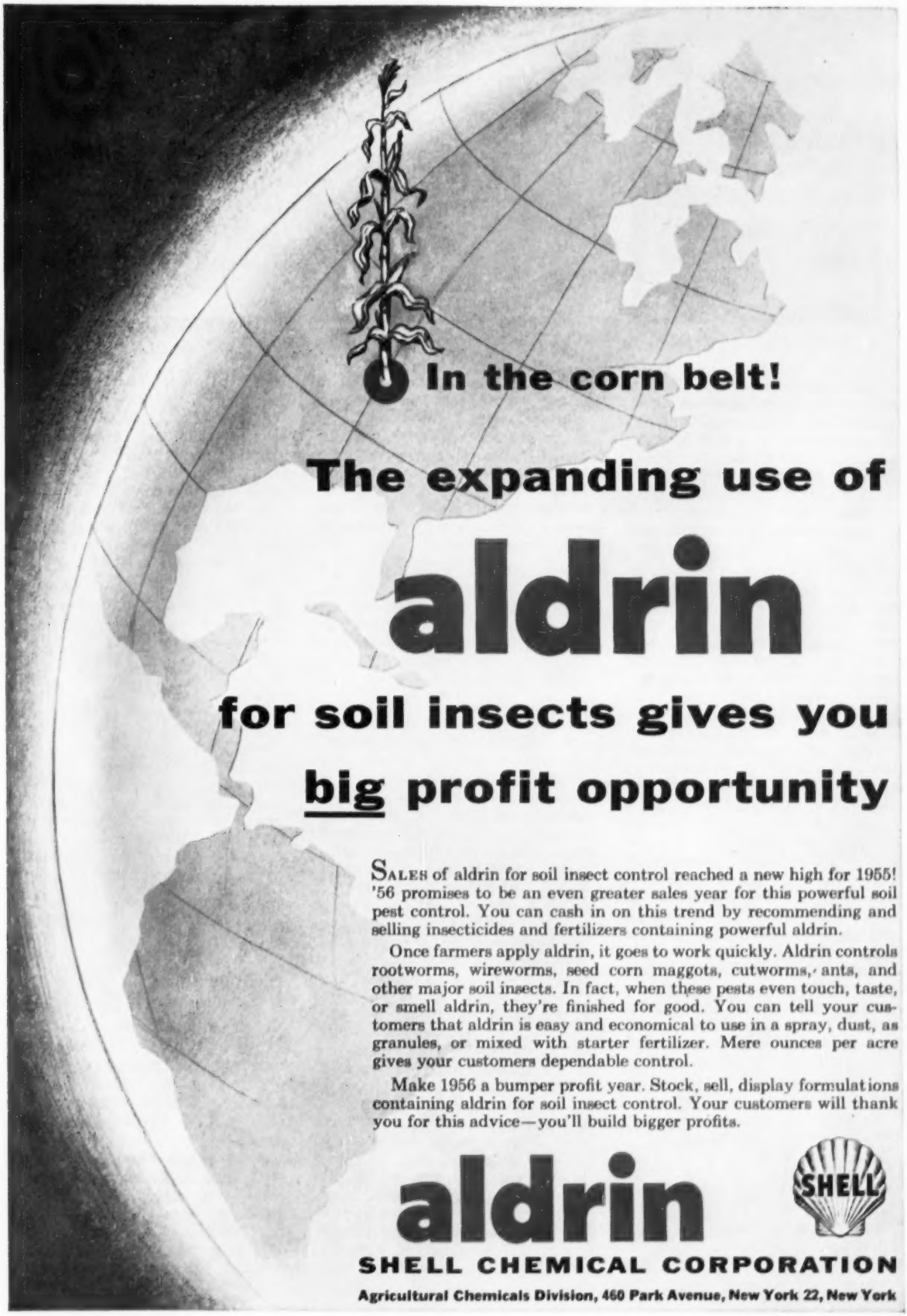
Lion also provides an expert technical staff to assist you in solving difficult formulation and processing problems. And, throughout the year, Lion's sales building advertising tells farmers the plant food story—for your benefit. Lion's leadership in customer service stands out, offering you outstanding opportunities for increased profits—and your best season yet!

DISTRICT SALES OFFICES: NATIONAL BANK OF COMMERCE BUILDING, New Orleans, La. • SHEPHERD BUILDING, Montgomery, Ala.

LION OIL COMPANY

A DIVISON OF MONSANTO CHEMICAL COMPANY

EL DORADO, ARKANSAS


In the corn belt!
The expanding use of
aldrin
for soil insects gives you
big profit opportunity
SALES of aldrin for soil insect control reached a new high for 1955! '56 promises to be an even greater sales year for this powerful soil pest control. You can cash in on this trend by recommending and selling insecticides and fertilizers containing powerful aldrin.
Once farmers apply aldrin, it goes to work quickly. Aldrin controls rootworms, wireworms, seed corn maggots, cutworms, ants, and other major soil insects. In fact, when these pests even touch, taste, or smell aldrin, they're finished for good. You can tell your customers that aldrin is easy and economical to use in a spray, dust, as granules, or mixed with starter fertilizer. Mere ounces per acre gives your customers dependable control.
Make 1956 a bumper profit year. Stock, sell, display formulations containing aldrin for soil insect control. Your customers will thank you for this advice—you'll build bigger profits.
aldrin
SHELL
SHELL CHEMICAL CORPORATION
Agricultural Chemicals Division, 460 Park Avenue, New York 22, New York

Jim Andrews' chart of distribution problems.

AAI TACKLES NH_3 GROWTH PROBLEMS AT KANSAS CITY

Expanded sales of anhydrous ammonia for direct application are largely dependent upon this nutrient being promoted as a part of a total program of complete fertilization, declared William T. Kopp of Midwest Research Institute in his preliminary marketing survey report to the Agricultural Ammonia Institute which convened at Kansas City December 5-7.

Mr. Kopp, whose firm was retained by AAI to analyze the market potential and the problems of the agricultural ammonia distributor, based his comments on findings of the initial phase of this investigation. Increased consumption of ammonia is closely related to the degree consumer acceptance of all nitrogen fertilizers, he advised, and the ammonia group must assume a more prominent role in market promotion, cooperating with other groups wherever possible in this function, and benefitting from its proportionate share of increased fertilization.

Current nitrogen consumption of two million tons is only a fraction of that recommended by state authorities—as an example Iowa and Texas fulfil only one-sixth of recommended application, and Illinois uses one-third of its recommendation—and the potential maximum rates are well above present recommendations, he continued, so there are broad opportunities ahead as nitrogen fertilizer use grows.

No longer does the ammonia distributor have an advantage due to shortages of other forms of nitrogen, he reminded, and high profits of the period of rapid expansion are gone; having to compete on an equal basis, distributors must now make a businesslike approach to the future.

Many problems, centering mainly in the industry itself, must be resolved before any joint campaign can be launched toward a larger, more stable market. Price reductions, producer-distributor relationships regarding storage and supply, ownership or control of multi-distributor outlets, and many similar stumbling blocks must be straightened out.

Noting a trend toward farm ownership or leasing of applicator equipment, Mr. Kopp pointed out that the point of purchasing or renting a rig—rather than use the services of a custom applicator—has been fairly well established at 50 acres.

His preliminary recommendations to the Agricultural Ammonia Institute included the following: Sponsor research in schools toward new products and crops (perhaps citrus, soybeans or grasses) lending themselves to ammonia use, and toward new application methods and equipment. Help the schools to gain a better understanding of ammonia. Publish the results of this research, whether good or bad. Sponsor or encourage evaluation of market potential: delineate areas where usage is marginal or unprofitable due to rainfall, terrain, size of farm units, or other factors. Develop a system or accounting method for distributors to use in determining their actual costs—which will avoid any severe price-cutting. Devise sales kits for approaching the farmer in terms of his own best interests. Sell ag schools on ammonia's advantages, and through them the county agents. Increase membership, admitting smaller operators by scaling the cost to the size of the firm. Work out a plan for ammonia producers to bear the main cost of the research and market development programs, since their financial position is more secure than that of the distributors.

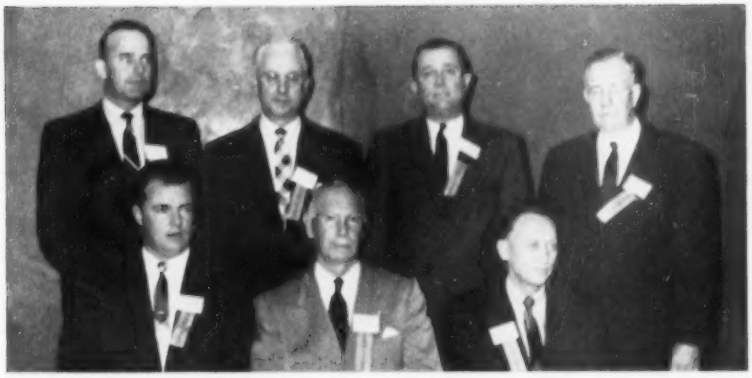
To the producers he recommended: Since the distributor needs help on promotion, design some brochures, advertising plans and test samples for selling. Help the distributor to finance farmers' purchases of storage facilities and application equipment. And recognize the sphere of the distributor's market—avoid or keep to a minimum the direct sales in this area.

His advice to distributors was: Follow the two main avenues of approach to the farmer—through the extension services, and the more effective direct sales approach. Know your cost of doing business. Use a personal approach as insurance salesmen do—know the farmer's requirements, his goals, and his soil. Use soil tests and recommend a total fertilizer program. Cultivate county agents and bankers. Work out an individual program of storage and application facilities for each farm. Buckle down to keener competition from other distributors as well as from other sources of nitrogen.

In conclusion, Mr. Kopp predicted a market situation that will see increased use of ammonia—along with increased use of all forms of nitrogen and other fertilizer materials—if promotion and sales effort are stepped up sufficiently.

Opening day of the convention, which attracted a crowd of 750, was devoted to a trade show by exhibitors whose booths lined the convention hall of Kansas City's auditorium.

A morning session got the second day under way. Following a welcome address by Mayor H. Roe Bartle of Kansas City, AAI President Mark C. Craft of Midwest Fertilizer Co., Springfield, Ill., gave his message. There has been much unrest among distributors this year,



New AAI officers and executive committee. Standing: M. H. Carter (secretary), Greenwood, Miss.; L. H. Wright (executive committeeman), Bartlesville, Okla.; Murray Rasberry (treasurer), Helena, Ark.; and Mark C. Craft, (executive committeeman), Springfield, Ill. Seated: Tully Talbot (first vice president), Audubon, Iowa; General Ralph H. Wooten (president), Memphis, Tenn.; and C. M. Corken (second vice president), Oklahoma City.

he said, and rumors made many unsure of themselves. Many gimmicks were introduced, but none proved to be a complete answer to the problems. Price cutting assured that many farmers will be "shoppers" before buying next season. Yet ammonia sales registered a 24.4% increase by USDA estimates, to capture approximately 20% of the total fertilizer nitrogen market. However, he concluded, continued expansion can be maintained by only one means: increased effort—helping the farmer, making recommendations for his other fertilizer needs, and serving him in a manner that will benefit him.

Herbert Pike, farmer from Whiting, Iowa who participated in the exchange tour of Russia earlier this year, described what he saw on his "10,000 Miles Thru Russia." Although the Soviet consumed 8 million tons of commercial fertilizers last year, he said, that's about all the nourishment the soil got, for manure is generally used as fuel instead of being applied to the fields. On the tour, he observed none of the postwar developments in fertilization practices that are so evident in the U.S. Progress made in Russia, he claims, has been in spite of and not because of their system.

Illustrating his talk with film slides he was permitted to make there, Mr. Pike described the farm system as a complicated piecework arrangement for labor crews. Despite conditins of insufficient rain fall and too-short seasons, he said much acreage has been converted to corn due to the need for pork—with salt pork bringing $4.00 a pound in the few open markets.

There is a tendency in Russia, he feels, to confuse bigness with efficiency, and farms and machinery fall into this pattern. Low priority has been placed on weed control, with herbicides virtually unknown even on experimental farms. His photographs showed how 80 million new acres have been plowed by emigrants from the cities, and sown in wheat. This virgin land is producing about 10 bushels an acre the initial year, with the yield dropping to 5 bushels the second year.

After the morning session, a "chuck wagon" luncheon served at the auditorium brought forth an amusing and informative talk from "Baron Von Stutterman." The afternoon meeting was given over to Mr. Kopp's preliminary report on the marketing survey, to the election of new officers and directors (reported elsewhere in this story) and to selection of the 1957 convention site. Atlanta, Ga. had already been established as the location of the 1956 conclave. After some deliberation (and two vote tallies) the nod went to Little Rock, Ark. for the 1957 gathering.

Ammonia producers played hosts to the delegates at a cocktail party that evening.

Continuation of the trade show marked the beginning of the final day of the meeting, and a single speaker held the spotlight at the business session that followed. He was H. B. Sharer of the Tire Division of U. S. Rubber Co., who spoke on "What Makes a Salesman a Star." Setting a fast pace, accelerated further with some clever feats of magic, he reeled off some pertinent advice: Select the right tools to sell with, and take the time to learn how to use them.

People don't buy a product, he reminded, they buy what the product will do for them. Since they can't actually see the benefits of ammonia or auto tires, both must be illustrated and demonstrated to be properly sold. Never, he closed, face a prospect empty-handed — have something there to show him and hold his attention.

Luncheon speaker was Jack Minnoch, executive director of the National Hide & Wool Assn., who had another inspirational message. Often, he began, we get so concerned with the competition that we forget about the customer. Don't worry about the competition—but if you haven't something different to offer, then find it. After all, he advised, there's a market for everything and for everybody—but you've got to find yours.

Returning to the auditorium for the final afternoon session, the group heard James H. Andrew of Andrew Farm Store, Jefferson, Iowa describe Dealer Problems, and tell how he has managed to overcome some of them. Just because a distributor is small, he emphasized, is no reason he can't do a good job. Right from the start, the small distributor has such a large investment in his business that he's big business.

Since ammonia is a seasonal operation (3 heavy months and 3 moderate months in his area), he suggested other allied seasonal lines that will round out the year: dealing in dry fertilizers, feed and live-stock supplies, seed corn, farm chemicals and crop dryers. These, he showed, have enabled his firm to build a year-round business that can attract high-caliber employees through good wages and steady employment for twelve months.

Overcoming the "new product" difficulty can be eased with suggestions of the '56 model nitrogen source—and with making potash and phosphate available to those farmers who need it. His own firm has a small mixing plant that mixes these other two elements, plus bulk spreader service for the mixture.

Poor-merchandising difficulties can be surmounted, he said, even though the average distributor had no previous selling experience, by seeking new customers instead of "fence-jumping" and price-cutting and by taking a real interest in these new customers.

An uninformed public can be educated through planned (instead of "canned") advertising. Jim illustrated with some slide projections of his own newspaper ads, bearing out his scheme of showmanship without sensationalism. Farmers are easily scared, he concluded, but don't be afraid to be a little different in your approach.

Finale on the convention program

Panel on "Agronomic and Soil Characteristics of NH_3": Dr. Lewis B. Nelson (chairman), U. S. Dept. of Agriculture; Dr. D. G. Aldrich, Univ. of California; Dr. W. B. Bartholomew, Iowa State College; Dr. George E. Smith, Univ. of Missouri; Dr. W. B. Andrews, Mississippi State College.

AAI Officers For 1956

President—Major General Ralph H. Wooten, Memphis, Tenn.
1st Vice President—Tully Talbot, Audubon, Iowa
2nd Vice President—C. H. Corken, Oklahoma City, Okla.
Secretary—M. H. Carter, Greenwood, Miss.
Treasurer—Murray O. Rasberry, Helena, Ark.

Executive Committeemen

M. C. Craft, Springfield, Ill.
L. H. Wright, Bartlesville, Okla.

New Directors (3-year terms)

Otho Clark, Clark Manufacturing Co., Atherton, Mo.
William D. Cook, Suburban Farm Service Company, Whippany, N. J.
Paul Duesterhaus, Deusterhaus Farm Supply, Fowler, Ill.
B. A. Frankl, Mor-Gro, Algona, Iowa
R. A. Krantz, Yaggy Plantation, Hutchinson, Kans.
Robert E. Poethig, Bastian-Blessing Co., Chicago, Ill.
J. Miller Porter, American Cyanamid Co., New York, N. Y.
S. C. Smith, The Smith Co., Uvalde, Texas

New Directors (filling unexpired terms)

James S. Andrew, Andrew Farm Store, Jefferson, Iowa
Ed Bickley, American Pipe & Steel Co., Los Angeles, Calif.

TANK STANDARDS RECOMMENDED

Three alternate methods of improving anhydrous ammonia tanks were adopted as part of the Industry Standards by the Agricultural Ammonia Institute Board of Directors at the annual convention at Kansas City.

This action was taken to minimize troubles with the tanks. It followed extensive research by the AAI through its technical committees.

The three approved methods of fabrication are:

A) Stress relieve the vessel after fabrication

B) Stress relieve cold formed heads in an approved manner

C) Use hot formed heads.

Research which led to adoption of these standards was conducted under supervision of the AAI Technical Research Committee working under the General Technical Committee. R. E. Poethig is chairman of the General Technical Committee, and Tom J. Dawson, chairman of the Technical Research Committee.

Data collected by the AAI had earlier been turned over to the Georgia Institute of Technology for an impartial evaluation of the problem of tank failure. Georgia Tech engineers prepared a report, stating that stress corrosion cracking is the major cause of tank failures, and confirming the AAI group's recommendations for methods of fabrication.

After his report was accepted by the AAI Board of Directors, Mr. Poethig asked the board to authorize continued research on the tank problem through Georgia Tech. The board approved this program and voted an additional $5,000 appropriation to continue the work.

Other reports were made to the AAI General Technical Committee and the board by the following committees: Standards, Paul W. Tucker, chairman; Weights and Measures, Douglas Johnston, chairman; Legislative Liaison, Paul Tucker, chairman; Technical Liaison, W. D. Cook, chairman; and Safety, Charles H. Boylan, chairman.

was a panel of outstanding agronomists who collaborated to give a broad scope to "Agronomic and Soil Characteristics of NH_3." Panel leader was Dr. Louis B. Nelson, head of Eastern Soil and Water Management Section, Agricultural Research Service, USDA, Beltsville, Md., who set the theme of the forum with the statement that "research can help to do the job more efficiently, and is especially important in these days of overproduction and low income."

First speaker was Dr. Daniel G. Aldrich, Jr. of the Department of Soils and Plant Nutrition, University of California, Davis. Speaking on the use of ammonia in irrigation water, he told how this method is generally restricted to those areas that are inaccessible to applicator equipment. Ammonia applied through irrigation water is sometimes faster-acting, he continued, but the distribution is of course no better than the efficiency of the water distribution.

Although solution in irrigation waters was the original method of applying ammonia as long as 20 years ago. Dr. Aldrich revealed that approximately 75% of ammonia used in the West today is injected into the soil. Describing experiments to determine losses at different temperature and water turbulence levels, he reviewed the virtues and limitations of the four principal irrigation-application methods.

The border method, used where large volumes of water are available and soils are coarse in texture, divides areas into a series of strips or beds by low, flat levees which usually extend in the direction of the steepest slope. Water is turned in at the upper end of the slope and moves down as a thin sheet, several strips being supplied from a common ditch or lateral.

The basin method is used where large amounts of water are available for irrigating soils of medium texture, and consists of dividing the field into rather large squares (smaller in the case of orchards) each of which is surrounded by low, flat levees and bordered by a supply ditch. Providing a large amount of water in a short period of time, this plan has found favor in the orchards of California, Texas, Arizona and New Mexico.

The furrow method—perhaps the most widely used for row crops, field crops and orchards—has modifications, but basically consists of applying water in furrows. Used on soils of varying texture and with medium to small volumes of water, it is versatile but necessarily gives

A Winning Hand . . .

5 PHILLIPS Fertilizer Materials for High Analysis Mixtures

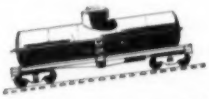
1 Ammonium Sulfate

New Premium Quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 Anhydrous Ammonia

Phillips 66 Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

3 Nitrogen Solutions



Get more N per dollar! There are three Phillips 66 Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low; help rapid, thorough curing.

4 Ammonium Nitrate

Phillips 66 Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills or pellets resist caking, handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for uniform free-flowing properties in formulations and top-notch crop response as a direct application material.

5 Triple Superphosphate

Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Offices in:

AMARILLO, TEX.—*First Nat'l Bank Bldg.*
BARTLESVILLE, OKLA.—*Adams Bldg.*
CHICAGO, ILL.—*7 South Dearborn St.*
DENVER, COLO.—*1375 Kearney Ave.*
DES MOINES, IOWA—*606 Hubbell Bldg.*
HOUSTON, TEX.—*1020 E. Holcombe Blvd.*
INDIANAPOLIS, IND.—*1112 N. Pennsylvania St.*
KANSAS CITY, MO.—*500 West 39th St.*
MINNEAPOLIS, MINN.—*212 Sixth St. South*
NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*WOW Building*
PASADENA, CALIF.—*604 Citizens Bank Bldg.*
RALEIGH, N. C.—*804 St. Mary's Ave.*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 E. Sprague Ave.*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*1214 South Dale Mabry*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

STAFF PICTURES AT AAI

1. Robert L. Lockhardt, Brea Chemicals, Brea, Calif., and Arthur H. Smith, Central Fertilizers, Moses Lake, Wash.

2. Ralph Huffman, J. C. Carlile Co., Marysville, Kans., T. C. Duffie, Quality Fertilizers, Chillicothe, Texas, and J. C. Carlile, J. C. Carlile Co., Denver.

3. Kaspar Peter, Phillips Chemical Co., Omaha, and Elmer G. Carlson, Chemco, Audubon, Iowa.

4. Virgil Rule, West Coast Chemical Enterprises, Walla Walla, Wash., and L. R. Hamilton, California Spray Chemical Co., Richmond, Calif.

5. Busy AAI Staff Members: Mrs. Hazel Harris, Executive Vice President Jack Criswell, and Mrs. Joyce Oates, all of Memphis.

6. Carl Haas and Don Kemmer, Haas Ammonia & Fertilizer Co., Modesto, Calif.

7. H. J. Stangel, Nitrogen Div., Allied Chemical & Dye Corp., Omaha, and M. A. Nicholas, Schrock Fertilizer Service, Springfield, Mo.

8. Fred Hosterman, Monsanto Chemical Co., St. Louis, Rex Seitzinger and Maurice Peterson, SPS Plant Food Co., Onawa, Iowa.

9. Joe Longstreth, U. S. Industrial Chemicals, St. Louis, Prof. C. J. Chapman, University of Wisconsin, Madison, and Jim Menn, U. S. Industrial Chemicals, Madison, Wisc.

10. M. E. Springer, University of Missouri, Columbia, and A. W. Moore, Consolidated Mining & Smelting Co., Trail, B. C., Canada.

11. Dr. Arthur Smith, Olin-Mathieson Chemical Corp., Baltimore, J. M. Porter, American Cyanamid Co., New York; W. F. Watkins, Olin-Mathieson Chemical Corp., Lafayette, Indiana, and T. R. Cox, American Cyanamid Co., New York.

12. Barney Rolfs, Flint Steel Co., Memphis, Charles Reimer, Reimer Fertilizer Service, Liberty, Mo., and W. E. Laitner, Missouri Growers, Carrollton, Mo.

13. Samuel N. Little, Texas Tech College, Lubbock, A. L. Bennett, Phillips Chemical Co., Amarillo, Tex., Nelson Clayshulte, Agricultural Products Co., Meisila, N. M.

14. Max Henderson and W. E. Nordquist, U. S. Steel Co., Pittsburgh, Pa.

deeper penetration at the places nearest the point of water introduction.

The sprinkler method is used where supply is limited and soil physical conditions promote excessive surface runoff or deep-percolation losses. Its necessarily high cost limits it to high-value crops and scarce-water conditions. Losses of ammonia are higher with sprinkler irrigation, but can be minimized if application is made when temperatures are lower (perhaps at night) and concentration is held to about 50 parts per million parts of water. This contrasts with the concentration of 110 parts per million tolerable with furrow irrigation. Average methods produce only about a 10% loss of ammonia.

"Nitrogen and Soil Microbes" was the subject of Dr. W. Victor Bartholomew of the Agronomy Department, Iowa State College, Ames. Summing up the evidence of his experiments, he generalized that ammonia can sometimes be toxic to soil organisms. Nitrogen applications are basically good in their effect on the numbers of microbes, since it produces a food value for them. It isn't the concentration of the ammonia that reduces the number of microbes, he explained, but simply the free ammonia concentrated in the zone of application that tends to reduce the number of microbes in this particular area, at least temporarily. Actually, he indicated, studies have shown an application rate equivalent to 10,000 lb. per acre had no harmful effect on the overall number of bacteria.

for BULK STORAGE...
FARM SERVICE...
or NH_3 APPLICATOR TANKS

FLINT STEEL

makes all sizes!

highest quality steel . . . easier-to-use fittings

APPLICATOR TANKS

100 Gal.	24" dia. x 57" O.A.L.	236 Gal.	37" dia. x 64" O.A.L.
157 Gal.	28" dia. x 70" O.A.L.	310 Gal.	37" dia. x 78" O.A.L.
200 Gal.	28" dia. x 83" O.A.L.	500 Gal.	46" dia. x 79" O.A.L.

FARM SERVICE TANKS

500 Gal.	28" dia. x 196" O.A.L.	1,000 Gal.	41" dia. x 193" O.A.L.
500 Gal.	46" dia. x 79" O.A.L.	1,000 Gal.	46" dia. x 145" O.A.L.

BULK STORAGE TANKS

6,000 Gal.	60" dia. x 43' O.A.L.	18,000 Gal.	94" dia. x 51' O.A.L.
7,145 Gal.	60" dia. x 51' O.A.L.	30,000 Gal.	106" dia. x 67'-1" O.A.L. using elliptical heads
8,000 Gal.	72" dia. x 39'-7" O.A.L.	30,000 Gal.	106" dia. x 68'-3" O.A.L. using hemispherical heads
10,000 Gal.	72" dia. x 49' O.A.L.		
12,000 Gal.	72" dia. x 58'-1" O.A.L.		

Whatever size tank you need, Flint makes it. Modern fabricating methods use superior Flint designs to advantage and give you a truly *better* tank. New individual fittings are easily replaced and are also the best made. They're completely protected from damage. For tanks that are built better — sell better — get FLINT.

ANCO MANUFACTURING & SUPPLY CO.

Tulsa • Des Moines • E. St. Louis

For Complete Information Contact Flint or ANCO

FLINT STEEL CORPORATION

MEMPHIS • Box 3155 TULSA • Box 1289

Turning attention to the other effects of nitrogen application, Dr. Bartholomew pointed out that data was not convincing on nitrogen speeding decomposition of crop residues. Application to low-nitrogen residues—such as corn stalks and cereal straws—may speed decomposition during the first few weeks of decay, but indications are that after a year there is no apparent difference between the treated and untreated residues. Nitrogen can, however, increase the humus content of the soil, and save the carbon. On the other hand, he illustrated that it can become stablilized or tied up in the residues, impairing its effectiveness as a fertilizer.

In conclusion, Dr. Bartholomew stressed that there is no objection to applying any fertilizer to crop residue, so long as the soil processes do not reduce the efficiency of the fertilizer.

Dr. George E. Smith, of the Soils Department of the University of Missouri, Columbia, reviewed some recent experimental data regarding application of ammonia. Speaking from slide projections of the information, he told how the clay soils of the corn belt hold ammonia better than the sandier and looser soil structures prevalent in the South. Describing some surprising results accidentally discovered in their studies, he showed that clods hold ammonia better than screened soil.

Dr. Smith further pointed to the graphic data of ammonia losses for 48 hours after release into the soil, and related the losses of the moisture level of the soil. Losses are negligible when moisture is ideal (around the 16-19% range), he indicated, but too much or too little moisture causes higher losses. In dry soils, the loss is more rapid; with too-damp soil, losses are slower but increase to total losses almost identical with dry-soil losses after a period of time.

Tests have shown ammonia to be held in narrow bands in the soil, extending outward about four inches from the point of release, he said, with the pattern varying due to soil type and moisture level. Held in these narrow confines by base exchange and surface adsorption, he explained, the actual rate of application to the portion of the soil used in crop growth is considerably higher than the indicated rate of per-acre poundage applied.

To wind up the panel, Dr. W. B. Andrews of the Agronomy Department, Mississippi State College—"father" of the ammonia injection method so widely used today—told how ammonia has performed well in most tests, provided the applicator knew how to use it and when to apply it. In corn production, he told how side-dressing is generally superior in results to pre-planting application, while the reverse is true with cotton crops. In high-lime soils, he explained, ammonia will nitrify down to about a freezing temperature, while in high-acid soils nitrification stops at about 50°.

Under some conditions he feels it is better to apply nitrate in the fall than ammonia. Further, it has been demonstrated that with vegetable crops ammonia side dressing is not as effective as nitrate; ammonia, he concluded, should be applied to these crops earlier to allow sufficient time for nitrification.

Results vary from test to test, he said, so none can be absolutely conclusive at present. As long as we have an inadequate amount of research, we'll continue to have differences of data and differences of opinion, Dr. Andrews surmised.

Following the final session's close, the ammonia producers again entertained at a cocktail party preceding the banquet—complete with professional (and amateur) entertainers—that brought the three-day meeting to an end.

TRUITT TALKS TO ALABAMA SOCIETY

Paul T. Truitt, executive vice president of the National Plant Food Institute, Dec. 9, told members of the Alabama Soil Fertility Society at a luncheon meeting that "the modern trade association has broadened its concept by treating industry interests in terms of the public welfare. The yardstick we most frequently use in our programs is centered around the philosophy that 'if it isn't good for the farmer, it isn't good for the industry that serves the farmer'."

He said that "the active ingredients for a successful trade association operation are found in two very shopworn words: Cooperation and Service—cooperation of the members in supporting the organization and program, and service by the staff to the members and to the public."

"A good association program is a steadying influence," he emphasized. "It operates on fact instead of rumor—on judgment instead of emotion—and on research instead of guesses."

"We strive for effective public relations among the members, with the colleges and universities, with all levels of state and federal agencies, and with trade groups and societies, such as the Alabama Soil Fertility Society," Mr. Truitt said. He enumerated 'tools' with which his own organization builds an effective public relations program.

"'The public be damned' attitude is going and soon will be gone in this country," he continued. "To be sure, trade associations are interested in the welfare of their respective industries—and that is why they are organized—but they seek to advance that welfare by methods geared to the total economy, not just one part of that economy, namely, their own interests.

"The real and primary justification for trade associations is their unique ability to perform functions which range from the difficult to the impossible when attempted by individual members alone.

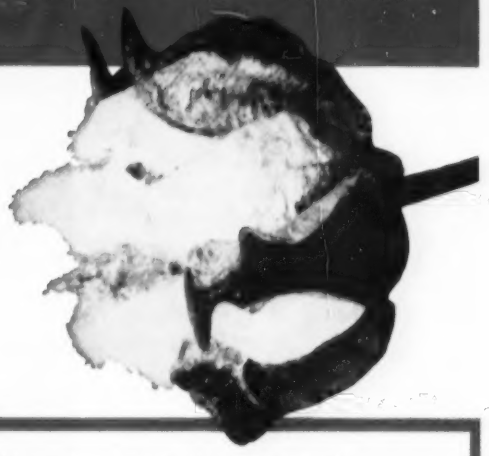
Winners in the National Plant Food Institute's annual Soil Builders Award for Editors' contest were honored at the winter meeting of the American Agricultural Editors' Association. Principals in the awards ceremony (shown above) were (left to right) Louis H. Wilson, Secretary and Director of Information for the Institute, who presented the awards; Earl W. McMunn, immediate Past President of the Association; George Johnson, Associate Editor of Successful Farming, winner in the category of magazines with more than 300,000 circulation; Homer Fine, Associate Editor of The Nebraska Farmer, who received the award on behalf of the magazine's Managing Editor Carl Deitemeyer, in the class of magazines with less than 300,000 circulation; and Thomas J. Anderson, Editor and Publisher of Farm and Ranch-Southern Agriculturist and newly-elected President of the Association.

Mr. Johnson and Mr. Deitemeyer were honored as two of the nation's outstanding agricultural writers who most effectively carried the message of soil building to their magazine readers.

with sufficient potash

IN COTTON, POTASH-ENRICHED FERTILIZERS MAKE THE DIFFERENCE

without sufficient potash



In nutrition-poor soils, balanced fertilizers make the difference between a bad or good crop for the farmer, a bad or good year for his pocketbook, too. Potash, a basic partner in these balanced fertilizers, builds crop resistance to disease, improves crop quality and increases yield.

U. S. P.'s high grade muriate of potash has the highest K_2O content and is free-flowing and non-caking—important advantages in the manufacture of these modern fertilizers which help American farmers to better crops and better incomes.

SUNSHINE STATE POTASH PRODUCT OF NEW MEXICO U.S.A.

REG. U.S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.

UNITED STATES POTASH COMPANY
INCORPORATED
30 Rockefeller Plaza, New York 20, N. Y.
Southern Sales Office
Rhodes-Haverty Building, Atlanta, Georgia

500 EXPECTED AT MIDWEST SOIL IMPROVEMENT MEETING

An attendance of more than 500 is expected at the forthcoming annual February joint meeting of Midwestern college agronomists and fertilizer industry representatives at the Edgewater Beach Hotel in Chicago.

The two-day meeting, sponsored by the Middle West Soil Improvement Committee, will be held February 16 and 17. Formal sessions will open Thursday afternoon and run through noon, Friday.

Reports by college agronomists on the latest research to promote more efficient fertilizer use will headline the program. The program will include special reports by soils specialists from four of the MWSIC states—Illinois, Kentucky, Minnesota and Nebraska. Starting this year, it is planned to set up a rotation whereby every three years, all of the 13 MWSIC states will be covered by comprehensive round-up reports on research. Altogether, ten talks and reports on fertilizer research are scheduled.

On the program, too, will be discussions of soil insecticides, their response and new developments in methods of application.

Factors that motivate farmers in adopting new and improved methods will come in for attention.

Dr. Kermit C. Berger, University of Wisconsin will be chairman of the meeting.

W. M. Newman, president of the Middle West Soil Improvement Committee, and Z. H. Beers, executive secretary, will welcome the soils men and visitors.

Of particular interest this year will be a dramatic presentation by two Iowa State College specialists on "How Farm People Accept New Ideas." Joseph M. Bohlen and George M. Beal, of the economics and rural sociology department will stage the presentation.

This rapid-fire presentation promises to be interesting not only for the significant information it makes available, but for the manner in which it is staged.

Thursday morning, Feb. 16, will be devoted to registrations and an informal meeting of agronomists and industry representatives. On the schedule, too, will be previews of educational movies, film strips or slide sets. MWSIC members and college agronomists are being polled on what visual aids they are interested in showing and viewing.

The Thursday afternoon program will open with special reports on research by agronomist from Kentucky, Nebraska, Minnesota and Illinois. Next will come a discussion of "The Response of Crops to Soil Insecticides," by Dr. J. W. Apple, University of Illinois. "Pastures that Pay" will be the concluding subject on the afternoon program with speakers citing examples of profit-building methods.

Dr. Russell Coleman, executive vice president of the National Plant Food Institute will be the first speaker on the Friday morning program. His subject will be "The Changing Fertilizer Picture and Its Implications." The Bohlen and Beal presentation will follow. Then will come a discussion of "New Developments in Soil Insecticides" by a representative of the Velsicol Corporation.

Dr. Earl R. Swanson, of the agricultural economics department, University of Illinois, will be the concluding speaker on Friday morning. His topic will be "Farm Planning for Top Profits."

Friday afternoon will be devoted to a fertilizer mechanical meeting, participated in by industry representatives and engineers of farm implement companies. The meeting will be designed primarily to give the implement industry engineers an opportunity to obtain information that will help them plan and design fertilizer application equipment best suited to farm needs. A panel discussion is planned as part of the program with a question and answer period to give engineers first hand facts.

1. CALIFORNIA FERTILIZER ASSOCIATION—Board of Directors: Front row, left to right: Secretary Howard H. Hawkins, Glendora; Vice President Jack Baker, Los Angeles; President Wm. E. Snyder, Los Angeles; Treasurer Wm. G. Hewitt, Berkeley; Executive Secretary & Manager Sidney H. Bierly, San Marion. Standing: Directors Fred R. Bryant, Schafter; B. H. Jones, Fresno; M. M. Stockman, San Francisco; and V. A. Frizzell, Salinas.

2. CFA Panel. Left to right: Dr. J. E. Knott, University of California, Davis; Howard H. Hawkins, Golden State Plant Food Co., Glendora; Gordon Bixler, AG & FOOD CHEMISTRY JOURNAL, San Francisco; Moderator, Dr. Daniel G. Aldrich, Jr., University of California, Davis; Dr. Guy F. MacLeod, Sunland Industries, Inc., Fresno; F. Haven Leavitt, Shell Chemical Corp., San Francisco.

3. CFA Membership Committee Meeting: Clockwise, beginning left center foreground—B. H. Jones, Fresno; Thos. Barnard, Azusa; L. S. Madsen, Phoenix, Ariz.; Mordy Rose, Salinas; Chairman Virgil A. Frizzell, Salinas; James M. Quinn, Los Angeles; John Williams, Chula Vista; Demont Galbraith, Woodland; Thos. Fleischman, San Francisco; Earle Kaplansky, Salinas; Bob Gigler, Los Angeles.

MISSOURI COUNCIL SHORT COURSE STARS LEADING SPEAKERS

Missouri's Soil Fertility and Plant Nutrition Short Course was held on the campus of the University at Columbia, Mo., December 15-16 sponsored jointly by the College of Agriculture and the Soil Fertility and Plant Nutrition Council of Missouri.

An afternoon session on the opening day, at which the University's John Falloon presided, featured a round of talks on Future Fertilizer Use. Individual assignments within the general subject were: Experiments—A Guide, George E. Smith, U. of Mo.; Tissue Tests Tell a Story, Walter Wilkening, Montgomery County Agent; My Fertilizer Program, Harold Hill, Scott County Farmer; The Credit Risks, E. J. Evens, Banker, Amsterdam (Mo.); and The Farm Business, J. W. Burch, U. of Mo.

After a recess, Gordon B. Nance of the College of Agriculture reviewed The Economic Situation Influencing the Use of Soil Treatments.

At a dinner meeting where W. A. Albrecht acted as toastmaster, A. W. Klemme, agronomist at Murchison's Ranch in San Antonio, Texas, spoke on Agricultural Production Possibilities in Missouri.

O. T. Coleman of the University presided at the following morning's session, featuring members of the College of Agriculture staff reporting recent information on some important subjects: Soil Fertility and Irrigation in Vegetable Production, Vic Lambeth; Grasses and Soil Fertility, Theo Dean and Marshall Christy; Soil Fertility and Plant Nutrition Problems, W. A. Albrecht; The Exchange Capacity of Soils, E. R. Graham; and Nutrient Balance in the Soil, C. M. Woodruff.

At the conclusion of the morning program, the Soil Fertility and Plant Nutrition Council of Missouri held its business meeting, with President Henry Lange of Lange Bros., St. Louis, at the helm.

The final session Friday afternoon found George E. Smith presiding. Initial speaker was K. D. Jacob of the USDA, Beltsville, Md., who described Trends in the Kinds of Fertilizer Materials Used in Agriculture. Melton Brown of the University followed with an outline of Liquid Fertilizer Trials and Results, and J. A. Roth of the College staff wound up the two-day meeting with some advice on Cotton Fertilization.

PACIFIC NORTHWEST ACTIVITIES

At their November meeting the board of Pacific Northwest Plant Food Assn. voted three scholarships of $100.00 each to students in the soils departments of Oregon State College, Washington State College, and the University of Idaho. Method of selection will be determined by the Soils Improvement Committee. The scholarships will apply for the year 1956-57.

The board also went on record discouraging displays at both the fertilizer conference and the annual convention.

The Soil Improvement committee chairman, Grant Braun and the secretary, Rod Bertramson, discussed with the Board plans for the annual conference to be held June 28, 29, and 30, 1956. A meeting of the Committee is to be held at Yakima, Washington the first week in January.

President Frank Meeker appointed Frank Taylor, Chairman, Lee Fryer and Henning Waltersdorph a Committee to determine the place for the 1956 Convention.

A Fertilizer Dealer meeting will be held in the Food Technology Building, Oregon State College, Corvallis, Oregon, Wednesday, January 18th. A committee worked on a program at Band with Tom Jackson.

The following committee appointments are effective for 1956:

Oregon Farm Project

Lou Hildebrandt, Chairman, Alec Runciman, Wm. Chorlton, Karl Baur, R. W. Finch, Grant Braun.

Membership

Alec Runciman, Chairman, Lee Fryer, Ben McCollum, John Hooper.

Legislative

OREGON: Karl Baur, Chairman, Don Burlingham, Jack Barber, Alec Runciman.

WASHINGTON: Sid Martin, Chairman, Lee Fryer, Lyman Judson, Bud Wolfkill, Frank Taylor, Henning Waltersdorph.

IDAHO: Ben McCollum, Chairman, Bud Newcomb, Ernie Hansen.

Convention Site

Frank Taylor, Chairman, Henning Waltersdorph, Lee Fryer.

Special Committee

Henning Waltersdorph, Chairman, Fred Parcher, Todt Tremblay, Sid Martin.

This Committee is charged with the job of exploring the possibilities of Industry participation in the promotion of Mixed Fertilizers in Washington after the Oregon Farm Project is completed.

A strong program has been set up for the Willamette Valley meeting for fertilizer dealers which is scheduled for January 18 under the sponsorship of the Pacific Northwest Plant Food Association. To be held in the Food Technology Auditorium of Oregon State, it will be under the chairmanship of T. L. Jackson.

The program includes these talks:

"What is the Basis of Fertilizer Recommendations." Soil fertility research work in the State of Oregon and the use of this information by H. B. Cheney.

"Oregon State's Soil Testing Program." How the soil testing service operates and a summary of Willamette Valley farmer samples by L. A. Alban.

"Lime and Efficient Use of Fertilizers." Circular 549 will be distributed and discussed. Some of the soil acidity problems in Western Oregon will be covered by M. E. Harward.

"Fertilizer Recommendations for Pastures." Growing legumes and grasses for irrigated and dryland pastures in Western Oregon by H. L. Schudel.

"Fertilizer Recommendations for Sweet Corn and Pole Beans" by H. J. Mack.

"Fertilizer Recommendations for Small Grain and Grass Seed Crops." The use of soil tests in making phosphorus and potash recommendations. Rate and time of application of nitrogen fertilizers by T. L. Jackson.

Oklahoma PFES Meets Feb. 15-16

In connection with the Crops and Soils Conference, February 15-16 in Stillwater, Oklahoma, the Oklahoma Plant Food Educational Society will hold its next meeting, according to president R. J. Kenyon. At their November meeting, the membership and dues articles of their by-laws were amended.

ARKANSAS ASSOCIATION ELECTS

At its recent meeting, held in conjunction with the annual state fertilizer school at Little Rock, the Plant Food Educational Society of Arkansas elected a board of directors for 1956. The new board in turn elected a slate of officers and outlined the organization's plans for the coming year.

Bill Dunklin of Planters Fertilizer & Soybean Co., Pine Bluff, was elected president; R. M. Morehead of Olin Mathieson Chemical Corp., N. Little Rock, became vice-president; and L. A. Dhonau of Arkansas Plant Food Co., N. Little Rock, was elected secretary-treasurer.

Elected to the board of directors, in addition to the officers, were: E. O. Baber, Chilean Nitrate Sales Corp., Little Rock; Dr. N. D. Morgan, American Potash Institute, Shreveport, La.; Z. H. Calhoun, Southern Cotton Oil Co., Little Rock; R. L. Morgan, Ark-Mo Plant Food Co., Corning; Dr. Joe E. Sedberry, Lion Oil Co., El Dorado; Joe Wepfer, El Dorado Fertilizer Works, El Dorado; H. T. Ray, Armour Fertilizer Works, Memphis, Tenn.; G. E. Davis, Portis Mercantile Co., Lepanto; and H. E. Brooks, International Minerals & Chemical Corp., Texarkana.

The new secretary-treasurer, L. A. Dhonau, was nominated by the board for appointment as the industry's representative on the State Plant Board. Discussion was continued regarding the need for a new fertilizer law that would require reports by counties, and agreement was general that the law needs extension to effectively regulate fertilizer grades, trace mineral content of fertilizers, and fertilizer-insecticide mixtures.

A resolution was adopted by the board to ask the head of the Agronomy Department to call a meeting for consideration of methods for furthering education on nutrient needs of the state's soils. Calling for participation of the Extension Soils Specialists, Associate Director of Extension Service, Director of Vocational Agricultural Education and the PFES President, the resolution urged study of soil judging contests, soil testing, fertilizer demonstrations and preparation of appropriate educational material on fertilizer usage.

The board also approved a plan of cooperation with National Plant Food Institute and Arkansas Bankers Association to promote use of selected fertilizer promotion ads by local bankers. The plan, similar to that worked out in some other states previously, provides for preparation of advertising plates by NPFI to be used in newspaper ads by cooperating bankers.

Final action, adopted in the general meeting session, called for a letter to associate director of the AES asking for employment of an additional soils specialist in the state to promote fertilizer demonstration work.

TEXAS HAS STRONG CONFERENCE PROGRAM FOR JANUARY 5-6

The program developed for the fertilizer conference scheduled for January 5-6 by the Texas A&M was full of meat. Subjects listed are:

Fertilizer Outlook for 1956. Reports of Industry representatives led by James D. Dawson, Jr. The ASC Program for 1956 by O. J. Moss. Fertilizer Grades and Ratios by Frank Boyd.

Influence of Quality of Water on Plant Nutrition by F. M. Eaton. Further Advances in Soil Physical Factors Affecting Plant Nutrient Uptake by E. R. Lemon. Soil and Water Management Practices Affecting Water Utilization by Plants by M. E. Bloodworth. The Interrelation of Nitrogen and Water Utilization by Coastal Bermuda by F. L. Fisher.

Some Effects of Fertilization on the Yield of Cool and Warm Season Vegetable Crops in 1955 by D. R. Paterson. Cotton Fertilization in the Northern Blacklands and Grand Prairie by C. O. Spence. Secondary Element Requirements of Soils of East Texas by F. L. Fisher. Fertility Studies in the Central Blacklands by R. M. Smith. Influence of Anhydrous Ammonia and Phosphorus on the Seedling Disease Complex of Cotton by L. S. Bird. Your Community Pasture Contest by Ted Trew. Correlation of Soil Tests with Field Response Data by A. G. Caldwell.

At the banquet, R. D. Lewis was scheduled as the speaker.

The conference staff included:

J. E. Adams, Dean, School of Agriculture; G. W. Adriance, Head Horticulture; L. S. Bird, Plant Physiology and Pathology; M. E. Bloodworth, Lower Valley Experiment Station; Frank Boyd, Agronomist, V-C, Montgomery, Alabama; A. G. Caldwell, Agronomy; James D. Dawson, Jr., Fidelity, Houston; F. M. Eaton, Plant Physiologist, U.S.D.A.; F. L. Fisher, Agronomy; J. F. Fudge, Agronomy; E. R. Lemon, Agronomy and U.S.D.A.; R. D. Lewis, Director, Texas Agricultural Experiment Station; O. J. Moss, A.S.C. of U.S.D.A.; J. B. Page, Head Agronomy; D. R. Paterson, Horticulture; R. M. Smith, Blacklands Experiment Station, Temple; C. O. Spence, Extension Service, Sherman; Ted Trew, Extension Service Specialist.

Arrangements have been completed for the next Fertilizer Conference, to be held January 3 and 4, 1957.

The Southwestern Fertilizer Conference and Grade Hearing will be held at the Buccaneer Hotel, Galveston, on July 19-20, 1956.

Weed Conference To Attract 300

More than 300 agricultural scientists are expected to attend the ninth annual Southern Weed Conference, January 16-18, in New Orleans, Dr. G. C. Klingman, conference president, reports. Dr. Klingman said that this should be one of the most informative conferences yet held by this group.

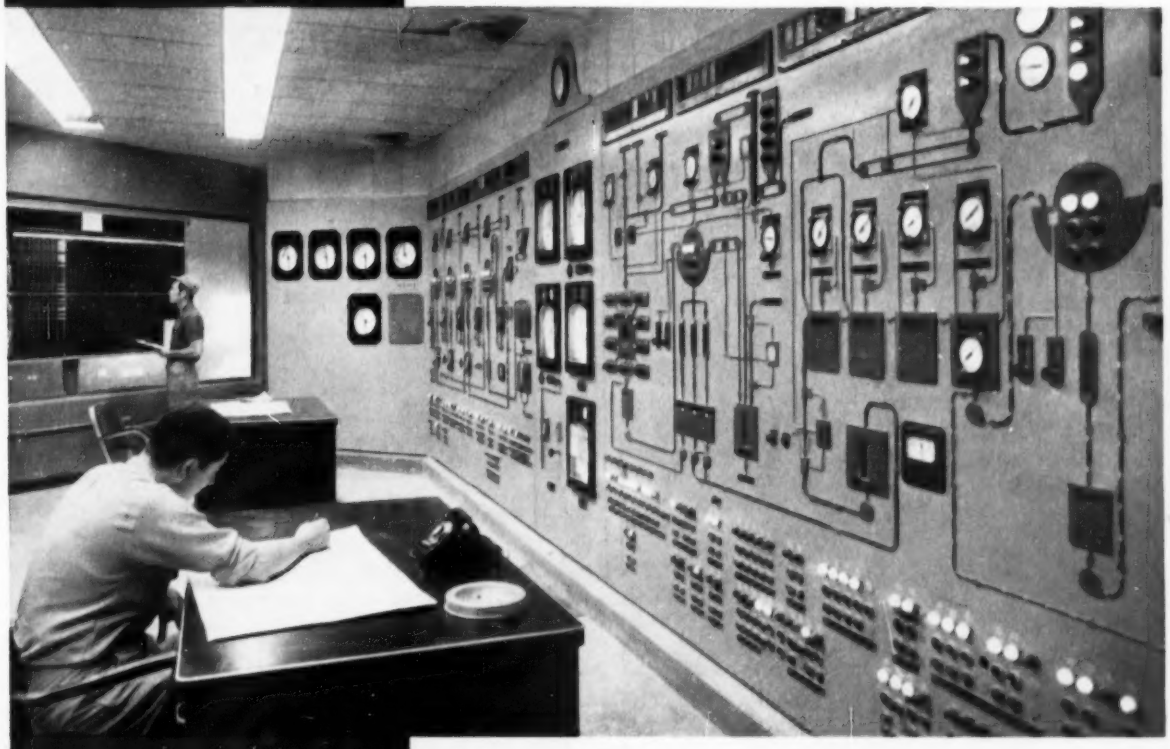
High on the agenda, will be weed control in field crops, cotton, horticultural crops, control of woody plants, plant psysiological problems in herbicidal investigations, extension and educational programs in weed control and other special weed problems.

Dr. M. B. Weed, appropriately named program committee chairman, indicated that a complete program would be released at a later date. Attending will be representatives from USDA, state experiment stations, extension services, vocational agriculture, the agricultural and farm equipment industries and farm leaders.

All sessions will be held in the Jung Hotel, New Orleans. Conferees are expected to reserve personal hotel accommodations.

International MINERALS CHEMICALS

A thousand "eyes" watch the quality



Result:

uniformly fine texture with
International's new

TRIPLE Superphosphate

The control room pictured above is the nerve center of International's vast plant at Bonnie, Fla. Last word in automation, it assures precise quality control of every step in the production of Triple Superphosphate.

Combined with natural air curing, it achieves uniformly small particle size and the correct chemical structure to deliver a higher percentage of available P_2O_5 — 46% or more.

If you haven't tried this superior triple super ingredient in your formulations, write or wire for sample and quotations.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Phosphate Chemicals Division • General Offices: 20 North Wacker Drive, Chicago 6

Control your moisture problem with FULTON WPPL* bags

*Water Proof Paper Lined

—at a lower cost than rigid containers

By: T. R. Moorer, Sales Manager, Bag Division, Fulton Bag & Cotton Mills, Atlanta, Georgia

Protecting costly chemicals from moisture, whether in transit or in storage, is only part of the problem. An equally important factor is to do so at the lowest possible cost.

Old-fashioned methods required expensive, heavy, rigid containers to keep moisture in its place. This also added to transportation cost and required extra warehouse space. Fulton WPPL bags have provided the answer.

Today, more and more firms give their chemical products complete, low-cost protection with Fulton WPPL bags. These are made of economical burlap or cotton laminated to paper or polyethylene.† WPPL bags have effected tremendous savings in many industries and should be able to do the same for you.

†Fulton's polyethylene-lined waterproof bags are acid and alkaline resistant.

WRITE TODAY

Special Services Division, General Sales Office
FULTON BAG & COTTON MILLS
1408 Annunciation St., New Orleans, La.

We have a problem in packing _____

_____

(Please feel free to write Fulton full details in complete confidence)

Name _____

Company _____

Address _____

Please write ☐ Have a representative call ☐

Let Fulton help solve your packaging problem

Fulton
BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK
OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAN FRANCISCO
SAVANNAH • WINTER HAVEN

COTTON CONFERENCE COMBINES SEVERAL BELTWIDE MEETINGS

Program topics were devoted almost entirely to new or improved means of expanding cotton production at the first annual Cotton Production Conference in Memphis December 15-16, but there was considerable concern over the shrinking market and its possible effect on the future of research—and adoption of improved practices.

Combining the functions of the beltwide conferences on insect control, defoliation, weed control and mechanization, the integrated meeting was preceded by a series of technical sessions which considered the topics separately before reporting to the general conference. With the expanded scope of the meeting a number of new areas came into the spotlight; included were irrigation, disease control, planting and spacing, and others, along with fertilization.

On hand to point up to the 800 conferees the key role of fertilization reducing unit production cost was Dr. Russell Coleman, executive vice president of National Plant Food Institute.

It was an indirect tribute to the efficiency of our industry that plant food was not one of the primary topics under discussion, for the need for fertilizer has been established well, and the industry has kept technological pace with the farmers' requirements.

Nevertheless, Dr. Coleman's spot on the program was the choice position, immediately following the opening addresses that dealt with overall problems and the need for integrating recommended practices.

Illustrating his presentation with graphic film slides, Dr. Coleman cited experiments from several cotton-producing states, comparing per-acre yields and costs using recommended fertilizer applications with those obtained from current usage. Averaging the increases estimated by state authorities, he showed how production cost per pound of cotton could be reduced from 28¢ to 22¢, with yields jumping from 339 lbs. an acre to 550 lbs.

Extending these projections, Dr. Coleman pointed out that farmers could increase average net income per acre from $15.51 to $56.94 by using proper kinds and amounts of fertilizer. Summarizing, he told how an integrated "package" of up-to-date production practices could be turned in the direction greater farm profits without contributing to the already-great surplus of cotton, and how this greater-yield-from-fewer-acres-at-lower-unit-cost plan dovetails with the soil bank proposal that has found such strong support in recent months.

The remainder of the program was devoted largely to insecticides, herbicides and defoliants among the chemicals for agriculture. But plant foods came in for an occasional mention, sometimes favorable, sometimes not.

Discussing soil-water-plant relationships, Dr. Morris E. Bloodworth, soil physicist at Texas Agricultural Experiment Station, said "It requires sound planning; knowing how, when and how much fertilizer to apply; inclusion of a good soil and water management program; and above all, initiative by the grower to study and improve his own farming practices."

Dr. A. L. Smith, USDA pathologist, urged use of resistant plant varieties, soil fumigation, crop rotation and "application of sufficient fertilizer

STEDMAN

FERTILIZER PLANT EQUIPMENT

Established in 1834

All Steel Self-Contained Fertilizer Mixing and Bagging Units

Batch Mixers — Dry Batching

Pan Mixers — Wet Mixing

Tailings Pulverizers — Swing Hammer and Cage Type

Dust Weigh Hoppers

Vibrating Screens

Acid Weigh Scales

Belt Conveyors — Stationary and Shuttle Types

Batching Hoppers

Bucket Elevators

Hoppers and Chutes

STEDMAN FOUNDRY & MACHINE COMPANY, INC.

Subsidiary of United Engineering and Foundry Company

General Office & Works: AURORA, INDIANA

to maintain maximum yields with sufficient potash to prevent rust."

On the "debit" side are quotes from two men who spoke on insect control. John T. Pressley, plant pathologist of USDA's Agricultural Research Service, recommended that growers avoid extra heavy applications of nitrogen which produce rank vegetative growth. And Dr. F. C. Bishop, entomologist from Silver Spring, Md., listed among his practices to assure a good crop (from the standpoint of weevil control) "Do not fertilize too heavily."

SOUTHERN AGRONOMISTS AND AG WORKERS SCHEDULE TOPICS OF FERTILIZER INTEREST

At the joint meeting of the Southern section of American Society of Agronomy and the Southern Agricultural Workers, to be held February 6-8, Hotel Biltmore, Atlanta, Ga. The following programs of special interest to our readers are listed.

For Tuesday, February 7, with J. Fielding Reed, American Potash Institute, presiding:

MORNING SESSION

"Effects of K and Na on Yields and Chemical Composition of White Clover"—A. E. Kretschmer, Jr. and N. C. Hayslip, Indian River Field Laboratory, Fort Pierce, Fla.

"Response of Cotton to Rates of N, P, and K at Eight Locations in 1955, As Related to Soil Test Values"—J. T. Cope, Jr., L. E. Ensminger, and R. D. Rouse, Ala. Agr. Exp. Sta., Auburn, Ala.

"Interrelationship of Yield, Plant Composition, and Available Soil Nutrients in Cotton Production"—D. A. Russel, G. E. Wilcox, and D. M. Johns, North Louisiana Farm Exp. Sta., Homer, La.

"Soil Fertility Levels in Mississippi—Soil Test Summary and Interpretation"—L. E. Gholston, Mississippi State College, State College, Miss.

"The Movement of Nitrate Nitrogen in Columns of Coarse Textured Soil Materials"—T. E. Bates and S. L. Tisdale, N. C. State College, Raleigh, N. C.

"Differential Response of Five Corn Varieties to Varying Fertility Levels in the Georgia Piedmont"—H. D. Morris, A. A. Fleming, and G. M. Kozelnicky, Univ. of Georgia, Athens, Ga.

"Effect of Deep Placement of Fertilizer and Subsoiling on Corn Grown on Flatwood Soils"—W. K. Robertson and J. G. A. Fiskel, Agr. Exp. Sta., Gainesville, Fla.

"Nitrogen-Potassium Balance in Corn Production"—F. L. Fisher, Texas A & M College, College Station, Texas.

"A Preliminary Report on the Effect of Crop Rotations on Peanut Yields, Soil Fertility, and Disease, and Insect Populations"—P. H. Reid, E. T. York, Jr., W. E. Cooper, and J. R. Dogger, N. C. State College, Raleigh, N. C.

"Effects of Major and Minor Elements on the Production of Clover-Pangola Hay Grown on Leon Sand"—J. G. A. Fiskel and T. L. Yuan, Agr. Exp. Sta., Gainesville, Fla.

"Zinc Content of Some Kentucky Soils and of Corn Grown on These Soils"—H. F. Massey, Univ. of Kentucky, Lexington, Ky.

AFTERNOON SESSION

"How Large Amounts of Nitrogen Are Utilized by Coastal Bermuda Grass"—F. L. Fisher, Texas A & M College, College Station, Texas.

"Establishing Bermuda Grass by Seeding"—E. A. Hodson, U.S.D.A., Little Rock, Ark.

"Effect of Nitrogen on the Palatability of Coastal Bermuda Grass"—G. W. Burton, B. L. Southwell, and J. C. Johnson, U.S.D.A., Tifton, Ga.

"The Relative Palatability of Five Grass Species When Fertilized With Different Levels of Nitrogen"—T. H. Taylor, R. E. Blaser, W. H. Skrdla and R. Hammes, Jr., Agr. Exp. Sta., Lexington, Ky.

"Does Nitrogen Fertilizer Retard Legumes"—C. Y. Ward, R. E. Blaser and C. I. Rich, Agr. Exp. Sta., Blacksburg, Va.

"Soybean Inoculation Studies in Florida"—G. D. Thornton and L. W. Erdman, Agr. Exp. Sta. and U.S.D.A., Gainesville, Fla.

"The Effect of Seed and Fertilizer Placement on the Establishment of Sericea Lespedeza"—O. J. Hunt, C. W. Gantt, Jr., W. C. Hulburt and R. E. Wagner, U.S.D.A., Beltsville, Md.

"A Growth Study of the Cotton Plant Under Controlled Environmental Conditions"—W. F. Sowell and R. D. Rouse, Ala. Polytechnic Institute, Auburn, Ala.

"Effect of Mulch Tillage Treatments and Fertilizer Placement on N, P, and K Contents of Corn"—J. E. Moody, J. N. Jones, and J. H. Lillard, Agr. Exp. Sta., Blacksburg, Va.

On the following morning, again under the chairmanship of Fielding Reed, the following are scheduled.

"Cotton Yield Response to Magnesium Fertilization on Ruston Fine Sand"—C. M. Johns, G. E. Wilcox, and D. A. Russell, North La. Hill Farm Exp. Sta., Homer, La.

"Soil Solution Soluble Salts As An Indicator of fertility level and Nutritional Balance"—C. M. Geraldson, Gulf Coast Exp. Sta., Bradenton, Fla.

"Inter-Relations of Irrigation, Soil Fumigation, and Fertilization of Crops Grown on Lakeland Sand"—T. C. Peele and R. H. Hawkins, Clemson Agr. College, Clemson, S. C.

"Soil Phosphorus and Its Fractions As Related to Response of Sugar-Cane To Fertilizer Phosphorus"—D. S. Byrnside and M. B. Sturgis, Agr. Exp. Sta., Baton Rouge, La.

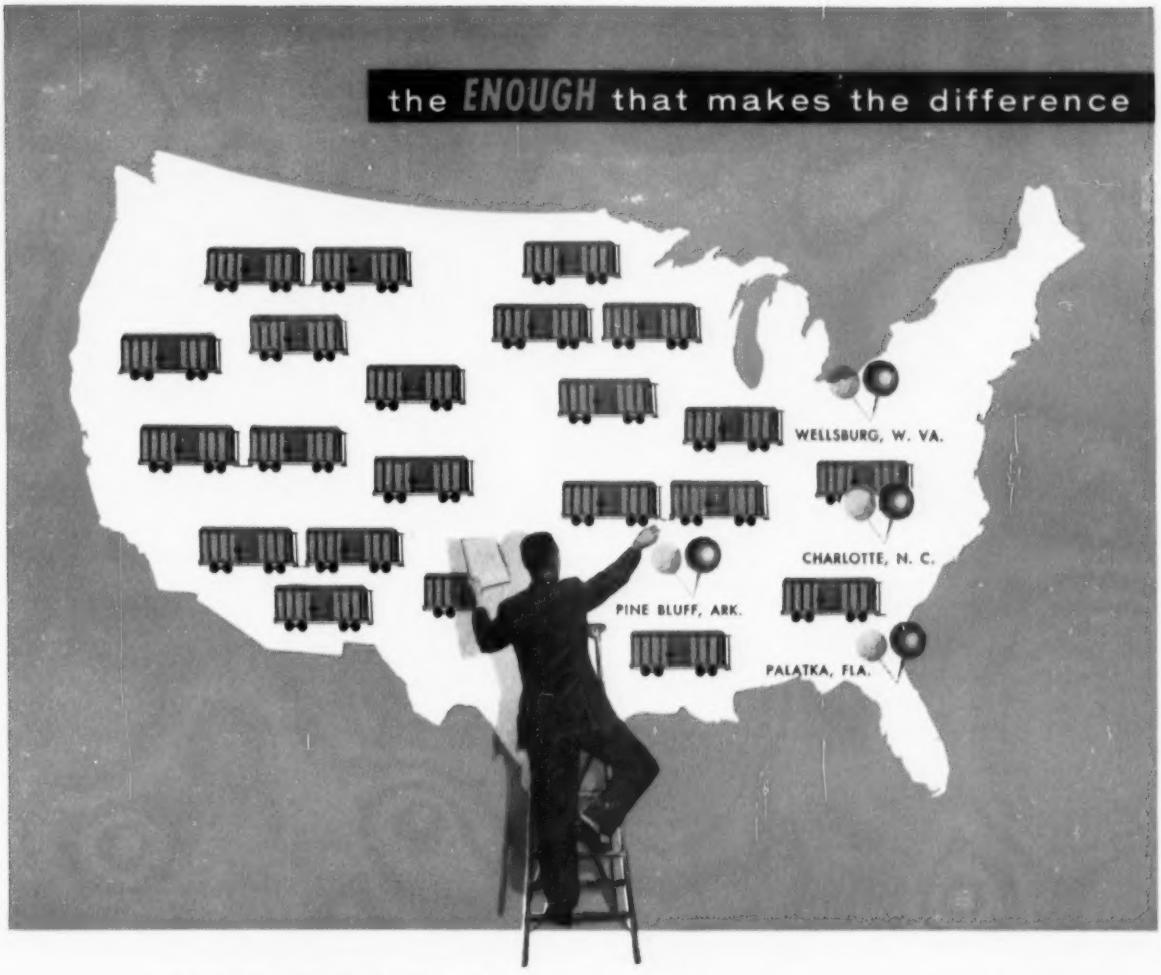
"Some Comparisons of Rock Phosphate With Superphosphate in Crop Rotations"—O. H. Long, Univ. of Tennessee, Knoxville, Tenn.

"Initial and Residual Effectiveness of Rock Phosphate in a Rotation"—E. C. Doll and H. F. Miller, Univ. of Kentucky, Lexington, Ky.

"Fruit Quality of Peanuts as Affected by Gypsum, Ca Level, and Type of Colloid"—A. Mehlich and A. Perry, N. C. State College, Raleigh, N. C.

"Fruit Quality of Peanuts As Affected By Sources of Calcium"—A. Perry and A. Mehlich, N. C. State College, Raleigh, N. C.

"The Nematocidal Effect of Soil Fumigation on Corn Yields At Homer, Louisiana"—G. E. Wilcox, M. J. Fielding, J. P. Hollis, and D. M. Jons, North La. Hill Farm Exp. Sta., Homer, La.



CONTROLLED SCHEDULING *is easier on the nerves!*

Complete integration from trees to strategically located plants makes centralized and controlled scheduling of Multiwall Sacks a reality at Hudson.

Our traffic board is tonic for the jangled nerves of harassed purchasing men. From the moment your order comes in to Hudson it is carefully scheduled and transmitted to insure delivery to your plant . . . on time and as you want it.

Central plotting continues while the order is in progress through every phase, and daily quality control checks are posted. More than just timely delivery, Hudson Multiwalls arrive with weight accuracy and skilled craftsmanship.

When you need them most, boxcars have a habit of becoming needles in the haystack . . . Hudson's Controlled Scheduling keeps them in sight, 'round the clock and to your door.

THE WHOLLY INTEGRATED OPERATION DELIVERS ON TIME!

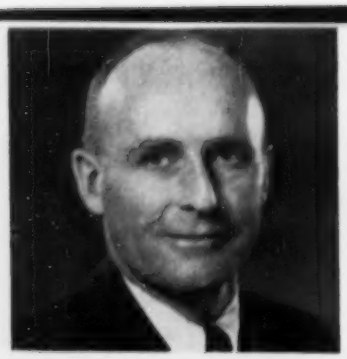
HUDSON PULP & PAPER CORP.
477 MADISON AVENUE • N.Y. 22, N.Y.
Plants at CHARLOTTE, N. C. • PALATKA, FLA.
PINE BLUFF, ARK. • WELLSBURG, W. VA.

HUDSON PULP & PAPER CORP.
477 MADISON AVENUE • NEW YORK 22, N. Y.

Yes! We'd like a copy of the 46-page illustrated book on "What to Look for in a Dependable Source of Supply," and details on the Hudson guarantee.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

Personals



Hugh Ferguson

Hugh S. Ferguson, president of **Dewey and Almy Chemical Company** division of **W. R. Grace & Co.,** has been named by the Grace board of directors as executive vice president in charge of the chemical group in the parent company. At the same time the Board announced also the promotion of six other officers to wider responsibilities and the election of **Alexander T. Daignault** as an executive vice president and chief financial officer of the international chemical, trading and financial concern.

The chemical group now headed by Mr. Ferguson includes four divisions—Dewey and Almy Chemical Company, **Davison Chemical Company, Grace Chemical Company,** and **Grace Chemical Research and Development Company.** Until this appointment, responsibility for directing Grace chemical activities was exercised by chairman of the board **Charles E. Wilson.** Mr. Ferguson will continue for the time being as president of Dewey and Almy.

Executive vice president **Allen S. Rupley,** and **Andrew B. Shea,** who has been head of the South American group, both take broad corporate responsibilities.

Succeeding Mr. Shea as executive vice president in charge of South and Central American operations, as well as **Grace Brothers Limited of London,** and **Pacific Coast and New York House Trading,** is **James H. Stebbins,** most recently in charge of operations for Peru, Ecuador, Chile, and Bolivia. He will be assisted by **John T. Whitely** as deputy. Mr. Whitely is vice president in charge of industrial and marketing service for the South American Group.

Leon Brownfield, formerly with Farm Belt Fertilizer and Chemical, who is now fertilizer production manager for Lone Star Brand at Nacogdoches, Texas.

* * *

Lucas A. Alden, who has been vice president and controller for the Company, moves up to replace Mr. Stebbins. **Fred R. Feuss,** until now assistant vice president and assistant treasurer, succeeds Mr. Alden as controller.

* * *

J. B. Rogerson, vice president in charge of manufacturing for **Lion Oil Company,** a division of **Monsanto,** announced Dec. 14 the creation of development and engineering sections within the company's manufacturing department.

John A. Sherred, who has been director of research development for Monsanto's plastics division in St. Louis, will be transferred to the Lion Oil Company Division as director of development, effective January 16, 1956.

Frank L. Emert, who has been assistant manager of the El Dorado refinery, is being promoted to the post of director of engineering. Mr. Rogerson also announced that **H. Harold Bible,** formerly assistant manager of manufacturing, has been named director of manufacturing.

James M. Quinn, California Sun Fertilizer Co., Los Angeles, who was given a plaque in recognition of his outstanding service to CFA and to the fertilizer industry through the years.

J. V. Bush has become sales manager for **Campbell Fertilizer,** Houston, Tex.

* * *

Dr. Marlow D. Thorne, recently associated with the **Agricultural Research Service,** USDA, has been appointed head of the **Oklahoma A. & M.** agronomy department, and will report for duty February 1. The announcement of the appointment was made by **Dr. A. E. Darlow,** dean of the school of agriculture and acting vice president while **Dr. Oliver Willham** is in Ethiopia.

Prof. **H. F. "Pat" Murphy,** former head of the A. & M. agronomy department, is scheduled to leave in December for Ethiopia, where he will be connected with the agricultural college there staffed by Oklahoma A. & M. personnel.

* * *

Southwest Potash Corporation has announced the appointment of **James J. Devlin** as Sales Manager, who has been in their New York office since 1952. Prior to joining Southwest Potash he was associated with the plant food industry for a number of years.

* * *

E. H. Rappe has been named district manager of **Swift & Co.'s** plant food division, with offices in Atlanta.

In announcing the appointment, general manager W. F. Price of the plant food division said Mr. Rappe replaces **A. L. Wiley,** who has retired after 50 years of service.

Mr. Rappe started with Swift 33 years ago.

* * *

D. Harold Johnson, manager of **Virginia-Carolina** bag division, has been named to the board of governors of the **Paper Shipping Sack Manufacturers Association,** a national association of 32 manufacturers of multiwall bags. Mr. Johnson, whose appointment was announced at the group's convention at Colorado Springs, Col., has been active in the association since 1950.

E. Earle Lacy, left who will head the new sales office and Hugh M. Griffith, factory superintendent of the new plant Virginia-Carolina has established at Rochester, N. Y. (See "Around the Map")

W. J. F. Francis, now vice-president in charge of sales for American Potash & Chemical. He has been Western general sales manager since 1952, and previously was with Pennsalt.

A. B. "Rex" Regan, who has been with Nitrogen Division, is now sales engineer for Blue Valley Equipment Mfg. Engr. Co., North Topeka, Kansas. He has an excellent background in granulation. Blue Valley now has 26 granulators in operation.

Fred Broadway, who has been with Royster and lately with Standard Chemical, is now Southeastern sales representative for National Potash, New York.

American Potash & Chemical Corporation has announced the appointment of **Paul E. McCoy** to the company's sales development department at its New York office. He came to American Potash & Chemical Corporation from Grace Chemical Company where he was in chemical sales and market research and development.

* * *

Russell W. Mumford, vice president and consulting engineer for **American Potash & Chemical Corporation,** retired recently after 35 years service with the company.

His career with AP&CC began in 1920 when he was named chemical engineer in charge of research and development of the company's main plant at Trona, Calif.

* * *

L. N. West, executive vice-president, **Wilson & Geo. Meyer & Co.** Intermountain, Pacific Coast distributors of agricultural and industrial chemicals, Dec. 13 announced opening of a new office of the firm in Denver, Colorado, in charge of **Jerome Brim.**

The new office, located at 851 North Broadway, was opened primarily to handle distribution, in the mountain and plains States, of the concentrated phosphate products of the huge new plant of **Western Phosphates, Inc.** at Garfield, Utah, West said.

* * *

Dr. J. Lynn Mellor, formerly assistant professor of soils at the University of Wyoming, has joined the agronomy staff of **Olin Mathieson Chemical Corporation's** Western fertilizer division, and will serve as agronomist for the company's Western District.

Thomas B. Hooks, Jr. of Houston has been named manager of sales training for the Western district. His headquarters will be in Little Rock, Arkansas. Mr. Hooks joined the company in 1950.

* * *

John Lacey, American Farm Bureau Federation, has been elected president of the **Agricultural Relations Council,** with **Louis H. Wilson, National Plant Food Institute,** as vice-president.

Lowell A. Kern, American Petroleum Institute, was re-elected secretary of the Council.

Named to serve three-year terms on the board of directors were: **Roy Battles, National Grange** and **Burt D. Loken, Chicago Board of Trade.** Four directors, whose terms continue through next year, are: **Ladd Haystead, American Petroleum Institute; Wallace S. Moreland,** Rutgers University; **C. L. Mast, Jr., Agricultural Leaders' Digest,** and **Dave O. Thompson, Sr.**

* * *

Dr. E. T. Casler has been promoted to manager of the Florida operations of the phosphate minerals division of **International Minerals & Chemical Corporation** effective January 1, 1956, according to an announcement December 20 by **George W. Moyers,** vice president in charge of the division.

Dr. Casler replaces **Floyd B. Bowen** as manager of Florida operations, Mr. Bowen having recently been promoted to production manager for the phosphate minerals division's operations in Florida, Tennessee and Montana. Mr. Bowen's headquarters remain at the division's Florida offices at Bartow. Dr. Casler joined International in 1942.

* * *

Glen Reese, formerly with **Hinshaw Grain** has become manager of **Arcadia Fertilizer,** and has moved to Knox, Ind.

* * *

William H. Evans, a vice president of **Diamond Alkali Company,** Cleveland, Ohio was elected to the board of directors. His election fills a vacancy.

* * *

Royland C. Rayburn, prominent in Tuscola, Ill. has joined **Escambia Bay Chemical,** Pensacola, Fla. to do market development work in northern Florida, southern Georgia, Alabama and Mississippi. He joined them January 2.

* * *

Malcolm E. Hunter has been appointed a vice president of **Nitrogen Division.** He will continue to be in charge of sales having formerly performed this function as assistant to the president (of Nov. Personals.) Announcement of the appointment was made by Nitrogen Division president **Hugo Riemer.** Mr. Hunter has been a sales executive in Nitrogen Division for five years. Prior to that, he was general sales manager of the fertilizer division of **Virginia-Carolina.**

* * *

The appointment of **Peter H. Walmsley** as assistant manager of their New Orleans branch has been announced by **Fulton Bag & Cotton Mills.** Mr. Walmsley joined the company over six years ago. Fulton's

Blaw-Knox appointments: Arne O. Olson, v-p engineering; George E. Kopetz, v-p production; Edward S. Wright, v-p construction; Keator McCubbin, v-p manager Midwest headquarters; Charles F. Hauk, vice-president sales. Mr. Kopetz is a Blaw-Knox vice-president; the others are vice-presidents of the Chemical Plans division.

New Orleans branch is under the managership of Jason M. Elsas, Executive Vice-President.

• • •

Election of **M. G. Woodward** as treasurer, assistant secretary and controller of **Southern Nitrogen Company, Inc.** was announced Dec. 10 by **John R. Riley**, president. As our readers know the new company is constructing a $14,000,000 petrochemicals plant in Savannah, Georgia to start the production in early 1957 of 250 daily tons of nitrogen solutions for fertilizer use, and prilled ammonium nitrate.

• • •

Pacific Coast Borax Co., division of Borax Consolidated, Limited, has announced that effective immediately the following personnel changes would be made in their Agricultural Sales Division:

F. T. Winters, Jr. has been appointed special advisor on herbicide sales to the parent company, Borax Consolidated, Limited in London. **Dr. L. M. Stahler** has been appointed manager of the agricultural sales division and henceforth will direct the activities of that sales organization throughout the United States. His headquarters will continue to be in Los Angeles. **Dale Rake** has been appointed director of agricultural research and development which position was formerly held by **Dr. L. M. Stahler.** He will be responsible for research and development work, particularly on the Company's herbicide products, and will also be headquartered in Los Angeles.

• • •

Stewart Eckers has been made manager of the Baltimore sales office for **Bemis Bro. Bag Company.**

• • •

P. F. Finley, formerly in charge of the **Bemis** Baltimore office has become Assistant Salesmanager for **Kraft Bag Corp.** in charge of Southeast multiwall sales. **P. E. Bray** has joined them as field engineer on their Kraftpacker automatic bag filling machine, and will work on sales on the Southeast.

• • •

Robert L. Wicker has been made salesmanager of the **Federal Motor Truck** division of Napco Industries. He had been general sales manager of **Dart Truck.**

• • •

H. S. Gordon, Jr. is now district manager for **Chilean Nitrate Sales** at Jackson, Miss. Retiring manager **W. H. Milam** will continue with the firm as a consultant.

CROP CHEMICALS

Don't Worry About Miller Amendment

L. S. Hitchner, executive secretary, National Agricultural Chemicals Association, has endorsed the statement by Winton B. Rankin, assistant to the commissioner, Food and Drug Administration, that growers have nothing to worry about from the Miller Pesticide Residue Amendment if they follow approved directions in applying sprays and dusts to their crops.

Speaking at the 47th annual meeting of the Vegetable Growers Association of America December 7, Mr. Rankin pointed out that the new law did not change the basic requirement of the Food, Drug and Cosmetic Act that foods in interstate commerce shall be safe.

"What the new law does is to set up a more convenient method of determining what is a safe residue and announcing this safe level or tolerance level to the public," Mr. Rankin said.

Only Recent Knowledge Prevents Food Shortage

Only the accumulated knowledge of a single century stands between even the most enlightened peoples of the world and the threat of food shortage, if not actual famine and starvation, Dr. Max T. Goebel, technical director of the Du Pont Company's Grasselli Chemicals Department, said last month at Bowdoin College.

Dr. Goebel told how plant pathologists, agronomists, entomologists, plant breeders, chemists, and agricultural engineers, working as a team, have gradually brought under control, though not eradicated, most of the serious pests, be they insects, fungi, bacteria, or viruses which affect plants above the soil line, and which in the latter half of the 19th century, brought on a 40-year period of distress for European agriculture which has been compared to the ten plagues of Egypt.

Treating Cotton Seed With Systemic Chemicals

A "systemic" cotton insecticide, applied as a seed treatment, has proved highly effective in controlling early-season cotton pests in field tests throughout the South this year, the U. S. Department of Agriculture announced Dec. 16.

This new chemical will be recommended for limited grower trials next year by USDA and probably also by some of the southern State agricultural experiment stations, the Department says. USDA scientists consider it desirable to have such new treatments tried on a limited grower basis before general recommendations are made.

Department research entomologists also have under test several other promising systemics for cotton. These chemicals are readily absorbed into the seed and "grow up" with the plant, retaining ability to control several types of insects and mites that attempt to feed on young cotton.

Insects Carry Cabbage Virus

Two types of virus which attack cabbage and reduce yields are carried by insects, according to observations at the Experiment Station at Geneva, N. Y.

"One strain, known as virus A, is the turnip mosaic virus," explains Cornell plant disease specialist Doctor John J. Natti. "The other strain is known as virus B and is a cauliflower mosaic virus. Both are readily transmitted from infected to healthy plants in the field, but the viruses are not carried in the seed."

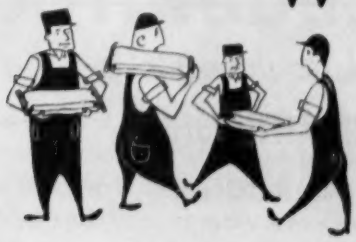
Aphids are the chief carriers of virus infection from diseased to healthy plants.

Maine AES Warns Of White Pine Weevils

The white pine is by far the most valuable lumber tree grown in Maine, according to Dr. Charles O. Dirks, an associate entomologist of the Maine Agricultural Experiment Station. Writing on the control of white pine weevils, the chief destroyer of white pine quality, Dr. Dirks points out that control of the insect must be continued during the early growth of the trees. After the tree has reached a height of 18 to 20 feet, control is not so important because the weevils seek out small, healthy trees for their egg-laying and feeding activities.

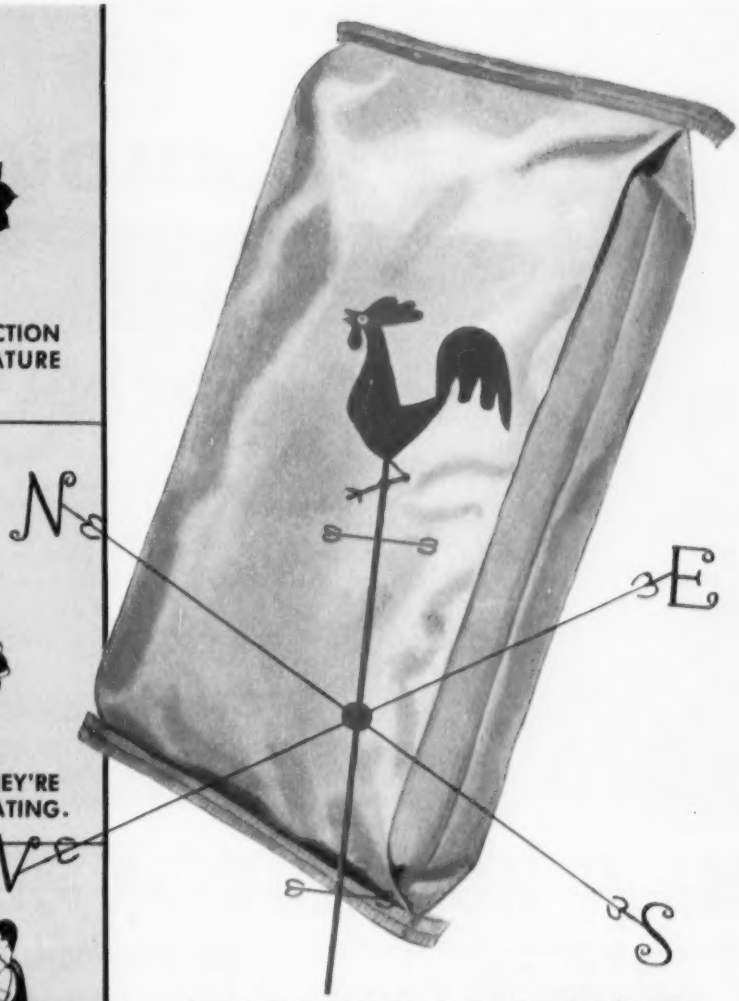
UTMOST PRODUCT PROTECTION OVER GREATEST TEMPERATURE RANGE.

SHIP WITH CONFIDENCE. THEY'RE STRONG—WILL TAKE A BEATING.



ELIMINATE "HARD-TO-HANDLE" COMPLAINTS. WORKMEN LIKE THEM.

GET THE FULL MERCHANDISING VALUE OF AN ATTRACTIVE DESIGN EXPERTLY REPRODUCED UP TO 4 COLORS.



WEATHER-WISE

PACKAGING WITH "ARKSAFE" *ALL-TEMP MULTIWALL BAGS*

North — East — South — West . . . Your product is better protected when packed in "Arksafe" ALL-TEMP Multiwall Bags. ALL-TEMP LAMINANT is plasticized asphalt that remains flexible in cold climates — does not crack to allow moisture penetration — and doesn't bleed in warm weather. Far superior to multiwall bags made with an ordinary asphalt ply.

ALL-TEMP Multiwalls cost no more!

ARKELL SAFETY BAG COMPANY

10 East 40th Street, New York 16, N. Y.
6345 West 65th Street, Chicago 38, Ill.
Plants: Chicago, Illinois · Newport News, Virginia

ARMOUR

THE GREATEST NAME IN FERTILIZER

31 FACTORIES AND OFFICES
CONVENIENTLY LOCATED TO SERVE YOU

Albany, Georgia
Atlanta, Georgia
Augusta, Georgia
Baltimore, Maryland
Bartow, Florida
Birmingham, Alabama
Carteret, New Jersey
Chicago Heights, Illinois
Cincinnati, Ohio
Columbia, South Carolina
Columbus, Georgia
Dallas, Texas
East St. Louis, Illinois
Greensboro, North Carolina
Houston, Texas
Jacksonville, Florida
Jeffersonville, Indiana
Memphis, Tennessee
Montgomery, Alabama
Nashville, Tennessee
New Orleans, Louisiana
Winona, Minnesota
Norfolk, Virginia
North Kansas City, Missouri
Presque Isle, Maine
Sandusky, Ohio
Siglo, Tennessee
Waterloo, Iowa
Wilmington, North Carolina

Also sales offices in Havana, Cuba, and San Juan, Puerto Rico

ARMOUR FERTILIZER WORKS
General Office, P. O. Box 1585, Atlanta 1, Georgia

EVANS METAL COMPANY
EVANS
EVANS
ATLANTA, GA.

For your lead requirements!

CHEMICAL AND ANTIMONIAL

sheet lead and lead pipe

Evans Metal Company

Box 97 Northside Station • ATLANTA, GEORGIA • Elgin 4338

PULVERIZED
MASCOT
LIMESTONE

REPRESENTATIVE ANALYSIS

Calcium content —$CaCo_3$ value	52.47%
Magnesium content —$CaCo_3$ value	44.23%
Calcium Carbonate —Equivalence	96.70%

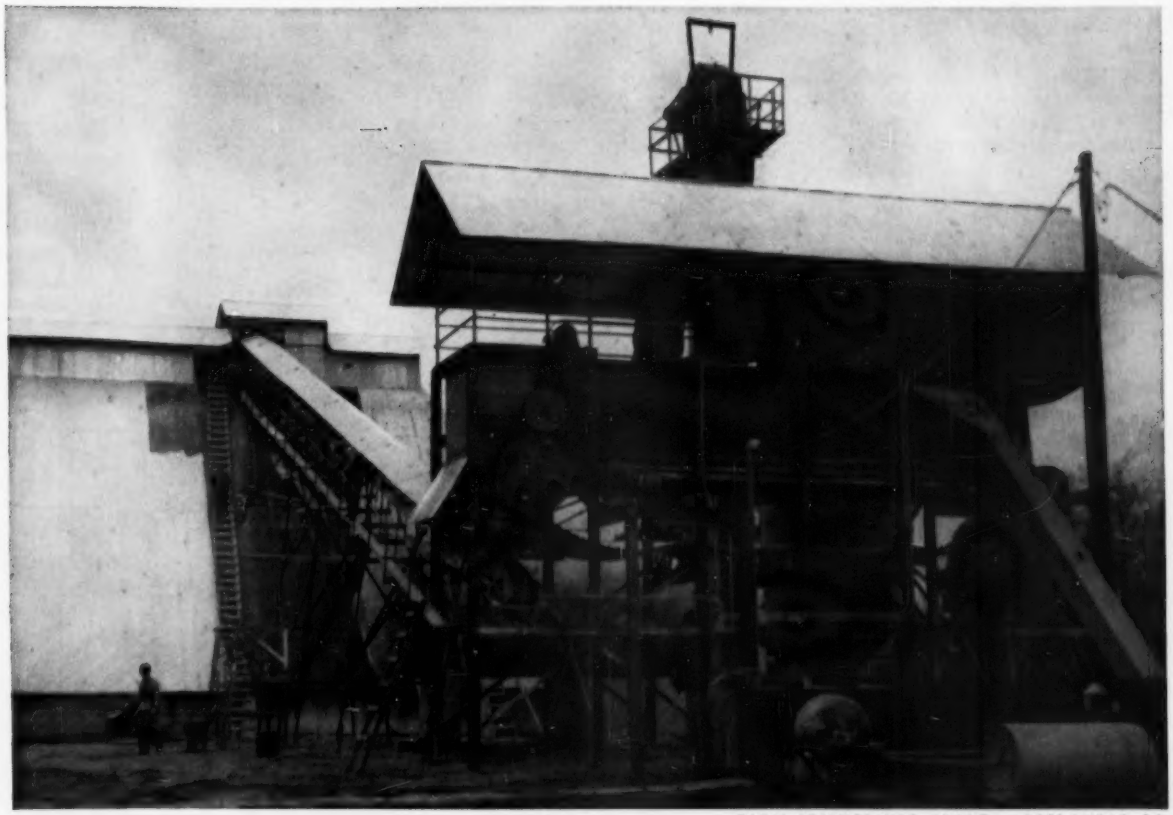
MAGNESIUM LIMESTONE

EACH TON OF MASCOT LIMESTONE
CONTAINS ABOUT

3.6 Lbs. Zinc	.75 Lbs. Manganese
4.8 Lbs. Sulphur	.05 Lbs. Copper

American Limestone Co.

Box 2389 Knoxville, Tenn.



FARM SERVICE, INC. PLANT • OPELOUSAS, LA.

CONTINUOUS ACIDULATION PLANT

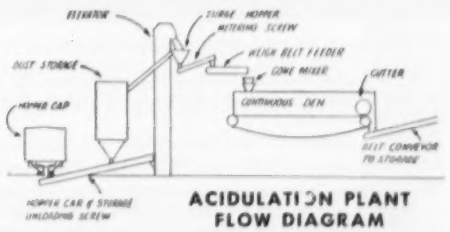
Low Initial Cost • Low Operating Costs

Now even small and medium sized fertilizer operators can afford a D-K superphosphate plant with a continuous den and TVA cone mixer. Operating costs are unusually low. Two men can operate the plant at the *continuous* rate of 20 tons per hour. An actual sample taken recently from a new plant at Opelousas, La. shows this remarkably high analysis *before curing*:

MOISTURE	9.36%
T. P. A.	20.88%
INSOLUBLES	1.37%
A. P. A.	19.51%
FREE ACID	3.18%

For Complete Information Call:

YOU ARE INVITED
to attend an
OPEN HOUSE
NEW FARM SERVICE, INC. PLANT
OPELOUSAS, LA.
JANUARY 27, 1956



ACIDULATION PLANT
FLOW DIAGRAM

DAVIDSON-KENNEDY CO.

1090 Jefferson Street, N.W. Atlanta, Georgia, U. S. A.

The complete story of the biology and control of white pine weevils is the lead article in the October issue of Maine Farm Research, the quarterly publication of the Maine Station. A reprint of the story will be published shortly. Copies may be obtained by writing the Publications Office, Maine Agricultural Experiment Station, Orono, Maine.

New Hyster Winch Is World's Largest

Availability of the world's largest towing winch of matched design for the huge new Caterpillar D9 crawler tractor has been announced by officers of the Hyster Company. The new Hyster winch, model D9A, develops a line pull of 76,000 lbs. Most powerful winch previously, the Hyster D8D, has 60,600 lb. line pull.

Additional information and specifications on this equipment can be secured at Caterpillar-Hyster dealers and distributors or by writing Hyster Company, 2902 N. E. Clackamas Street, Portland 8, Oregon, or 1800 North Adams Street, Peoria 1, Illinois.

Processed Sewage Subject Of USDA Circular

In response to public demand for cleaner streams, and the desirability of cutting sanitation costs and making worthwhile use of sewage by-products, the U. S. Department of Agriculture has issued a new circular on "Sewage Sludge for Soil Improvement." This semi-technical publication will be of interest to some farmers and to city and town sanitation authorities, fertilizer manufacturers and dealers, and crop and soil scientists.

Prepared by Dr. M. S. Anderson of the Agricultural Research Service, the circular discusses the processes by which sewage is reduced to safe, disposable water and sludge, and evaluates various forms of sludge in comparison with animal manures and certain mineral fertilizers.

Copies of the Circular (No. 972) may be obtained from the Superintendent of Documents Government Printing Office, Washington 25, D. C., at 10 cents each.

Lion Oil Gets Five Safety Awards

Lion Oil Company, a Division of Monsanto Chemical Company, was presented five safety awards last month in recognition of safety achievement, four at the El Dorado chemical plant and one to the general service department. Individual safe-working awards were also presented at Lion's three manufacturing installations to 141 employees and to seven general service personnel, representing an aggregate of 1,345 safe man-years without a lost-time accident.

Tull Buys Florida Metals

The J. M. Tull Metal and Supply Co., Inc., of Atlanta, has purchased controlling interest in Florida Metals, Inc.

The newly acquired corporation, which has principal offices in Tampa, with offices and warehouse facilities in Miami and Jacksonville, was organized in 1946 in Tampa.

SAM DENNARD has been named manager of the Jacksonville warehouse of Florida Metals, Inc. Mr. Dennard has been with Tull for 25 years.

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), in dusts (if you prefer them) and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphates:

INSTANT (powder) for quick and efficient mixing or Bordeaux sprays.

SUPERFINE (snow), **SMALL** or **LARGE CRYSTALS**, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Write for booklets that will help you solve your agricultural problems.

Control POND SCUM and ALGAE with Triangle Brand Copper Sulphate. Write today for information on how it can help you maintain healthy water conditions.

PHELPS DODGE REFINING CORP.
300 PARK AVE. NEW YORK 22, N.Y. • 5310 W. 66th STREET, CHICAGO 38, ILL.

OBITUARIES

John Harvey Buch, 93, founder and until his death president Farmer's Fertilizer Co., Elizabethtown, Pa., died November 13 at his home.

Daniel L. Fitzpatrick Sr., 84, retired owner of Jersey City Fertilizer Company, which he had conducted for 50 years, died November 17 at his home in South Orange, N. J.

W. H. McKenzie, 83, pioneer fertilizer man and the first president of the Georgia Cotton Seed Crushers Assn., at his home in Montezuma, Ga., November 17.

William J. Murphy, 60, vice-president and director of American Potash & Chemical, whom he joined at age 16; director of NPFI, American Potash Institute and American Potash Export Assn., died December 11 in hospital in Montclair, N. J.

One sharp pull – and you have a smooth, clean multiwall opening for precision-pouring. The smoothest bag opening feature available – either for sewn valve or sewn open mouth bags – is the new A&S Zip Top bag.

Wasteful "buckshot" pouring is eliminated because Zip Top – *with almost* no effort – provides a clean, controlled opening to empty all of its contents. Economy and customer-satisfaction are assured all around.

The new Zip Top feature is added to the other A&S multiwall advantages. You get outstanding colorful designs – clean, sharp printing – specification bag paper supplied by 4 big mills – the best possible combination of research and services. A&S customers are assured the experience and imagination of "the oldest name in paper bags" – almost a century of dynamic packaging and merchandising know-how.

To learn more about Zip Top – and other important special-packaging advantages–address the Package Engineering Department, Canajoharie, New York

ARKELL and SMITHS

500 Fifth Avenue, New York 36, N. Y.

"THE OLDEST NAME IN PAPER BAGS"

**Patent applied for.*

Manufacturing Plants at: CANAJOHARIE, N. Y. • BELLEFONTE, PENN'A. • MORRIS, ILLINOIS • PASSAIC (DELL), N. Y.

DOLOMITIC LIMESTONE

ANALYSIS GUARANTEED

. . . 60% Calcium Carbonate
. . . 39% Magnesium Carbonate

WILLINGHAM-LITTLE STONE COMPANY

1323 Fulton National Bank Building, Atlanta 3, Ga.

"42 Years Service to the Fertilizer Industry in the Southeast"

---

do you need to know . . .

How and when the farmer makes up his mind?

Or why he does things the way he does?

Or why he prefers a certain kind of equipment?

Or whether he's going to buy your product . . . again?

A nation-wide panel of farmers, large enough to be a representative cross-section of the American farm market is now ready for your use. It is classified and indexed to coincide with the breakdown used in the new 1954 census of agriculture. This panel can be used for definitive, intensive interviews that will give accurate answers to your most vital questions about the farm market.

This unique, carefully selected farm panel is statistically stable (better than 90% return), capable of reflecting accurately the opinions, attitudes, actions and intentions of the national, or regional, farm market. As such it can serve you to point up trends as well as to furnish current information. It provides facts on which production, research and promotional planning can intelligently be based.

OTHER DOANE RESEARCH SERVICES:

- Product testing
- Farm structure design
- Marketing and economic studies
- Community development

DOANE

Address your inquiries to: Box B,
AGRICULTURAL SERVICE, INC.
Market Research Division

3144 Delmar Blvd., St. Louis 8, Missouri • Phone: FOrest 1-2800

BERKSHIRE

Specialists in Magnesia for Agriculture

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 65% MgO

POTNIT
(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

INSECTICIDES — FUNGICIDES
Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES
Ferric — Zinc

EXPORT - IMPORT

BERKSHIRE CHEMICALS, INC.

420 Lexington Avenue, New York 17, N. Y.
55 New Montgomery St., San Francisco 5, California
Cable Address — "Berkshem" New York

ALUMINUM TANK
9'-0" Diameter x 30'-0" Long
12,825 Gallons

"Cole" can furnish tanks made of **steel**, **aluminum** and **stainless steel** — built in accordance with ASME Code to meet all insurance requirements. Measuring tanks of Stainless Steel are carried in stock.

We invite your inquiries for Storage Tanks to handle Ammonia and Nitrogen Solutions. Anhydrous Ammonia—complete with fittings. Also Elevated Water Tanks, Acid or Oil Storage Tanks, Bins, Boilers, Stacks, etc.

R. D. COLE MFG. COMPANY
Newnan, Ga.

STEEL TANK
8'-6" Diameter x 38'-6" Long
16,500 Gallons

For Bagging **— CHI-ORGANIC —** *For Mixing*

(Chicago Activated Sludge)

"THE ALL-ORGANIC PLANT FOOD WITH THE BUILT-IN CONDITIONER"

CHICAGO FERTILIZER COMPANY

Exclusive Sales Representatives

ALEX. M. McIVER & SON

P. O. Box 155 Charleston, S. C. Tel. 3-4828-29

Low Costs with **FUR-AG®**

the sterilized organic conditioner

For years . . . First Choice of Leading Fertilizer Manufacturers

Fur-Ag is an inexpensive organic conditioner that is produced in volume and shipped to you *on schedule* the year around. Fur-Ag reduces bag set, promotes drillability, speeds up curing in the pile and provides bulk. It is sterilized—free from plant diseases, insects, weed seeds—and being dark in color makes a rich-looking piece of goods. Write today for complete information—Bulletin 127.

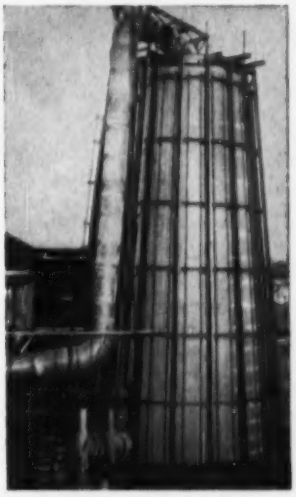
The Quaker Oats Company

CHEMICALS DEPARTMENT

345 The Merchandise Mart, Chicago 54, Illinois

LEAD LINED EQUIPMENT

or Construction of Complete Acid Plants



Southern Lead Burning Co.

ATLANTA 2, Ga.

P. O. Box 4627 Tel. WAlnut 2576

CAL-MAG OXIDES

CUT YOUR COSTS WITH →

Unexcelled for its superior Dehydrating, Neutralizing, and Curing factors in the preparation of better fertilizers. Write for complete information.

PROMPT SHIPMENTS

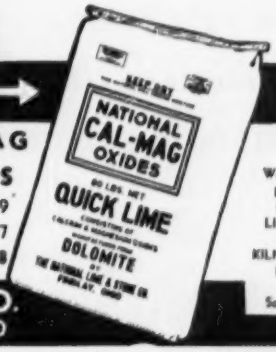
Three railroads serve our Carey, Ohio plant--assuring prompt delivery--everywhere.

CAL-MAG OXIDES

MgO 40.39

CaO 58.07

TNP 203.88



We Also Produce DOLOMITIC HYDRATED LIME (165 TNP) and KILN DRIED RAW DOLOMITE (107 TNP) Screened to size

The NATIONAL LIME and STONE CO.

General Offices • • • • • FINDLAY, OHIO

BRINGS TO THE

its unlimited supply of a wide variety of papers for the prompt production and delivery of Multiwall Paper Shipping Sacks.

NOW Raymond, as a wholly owned and integrated operation, has the outstanding advantage of Albemarle's vast paper manufacturing resources from forest to the finest Multiwall Kraft Paper, including specialty papers such as asphalt laminated, colored kraft, creped kraft, waxed kraft, and wet-strength paper.

BAG CORPORATION, Middletown, Ohio

Competitive Bidding For AEC Uranium Leases

Atomic Energy Commission announced December 21 that a system of competitive bidding will be instituted for leasing uranium deposits developed by the AEC on withdrawn public lands and certain other areas under AEC control.

Upon determination that a portion of the reserve should be leased, the AEC will award leases on the basis of competitive bids, rather than by the previous system of selecting lessees on the basis of qualifications, including mining experience and financial status.

Britons Demonstrate Dryer In Flying US Trip

A team of Britons is visiting America to demonstrate a machine which can extract fluids efficiently, quickly and cheaply from any substance. Among other industries, they will offer it to fertilizer manufacturers.

It is produced by E. H. Bentall & Co. Ltd of Maldon, Essex and is known as the "Powling Process" after its inventor. The process won the silver medal at the Royal Show this year, and has caused much stir in British agricultural circles.

Used on secret research for British chemical and essential oil concerns, the process is yielding many valuable by-products.

This Will Shock, Electricity That Is, But You Can Avoid Danger If You Heed The Precautions Outlined By V-C's Ralph C. Haltiwanger

Electrical Safety was the topic of Ralph C. Haltiwanger, chief electrician at the V-C chemicals and fertilizer plants, Charleston, when he spoke at the Fertilizer Section of the South Carolina Chapter of the National Safety Council.

"Electricity does not play favorites," Haltiwanger said. "Apparently harmless electrical equipment such as extension cords, electric drills or light switches are often the most dangerous."

Electricity and dampness or water are hazardous combinations; moisture is dangerous particularly in the presence of corrosive chemicals, according to the V-C speaker.

To overcome many of these difficulties, Haltiwanger outlined these precautions:

1. Proper and careful installation of suitable equipment.

2. Thorough grounding of all equipment. This means everything even the guard on the lamp of an extension light. In general, this means conversion to a three-wire system for all portable equipment. The third wire is a ground wire which greatly lessens the chance of faulty equipment electrocuting the user.

3. An electrical program of safety which would include preaching, teaching and living the safe methods of working with electricity.

Present at the safety meeting held in Charleston was Curtis A. Cox, Assistant Manager of V-C's Manufacturing Department, who is chairman of the Fertilizer Section of the National Safety Council.

F. B. Carpenter, Jr., assistant general superintendent at Charleston Chemicals who is Vice President of the South Carolina Chapter of the Fertilizer Section, acted as moderator of a panel discussion at the meeting.

Southern Steel Equip. Co.

936 Adamson St. SW

Atlanta, Ga.

Phone WAlnut 5813

FABRICATORS

of

Steel and Stainless Steel Tanks

Rotary Fertilizer Dryers & Coolers

Batching Hoppers

Dust Handling Equipment

New practical guide

COMMERCIAL FERTILIZERS

Fertilizer kinds, characteristics, and applications thoroughly described for fertilizer man and farmer

By G. C. COLLINGS
Clemson Agric. Coll.
5th Ed., 617 pp., 193 illus., $8.00

Modern techniques that spring from ever-growing research in the fertilizer field are put at your fingertips in the 5th Edition of this complete standard guide.

For over 25 years a highly regarded reference, this book presents the complete fertilizer picture. It covers sources, characteristics, and plant response for each major fertilizer or group of fertilizers—shows you, for example:

—how to meet problems of adjusting soil reaction and fertilizer practice to crop requirements.
—how to buy and use fertilizers.
—how to apply liquid fertilizers.
—how dry fertilizers influence germination and seedling growth.
—and hundreds of other facts vital to fertilizer manufacturers, dealers, farmers, nutritionists.

Every chapter in the 5th Edition has been revised and expanded to incorporate latest information on fertilizer manufacture and fertilizer practice.

"Dr. Collings book is one that belongs in every fertilizer plant and in every sales office of the entire industry."
COMMERCIAL FERTILIZER
March—'55

Examine it FREE!

McGraw-Hill Book Co., Inc.
Industrial & Business Book Dept.
327 W. 41 St., New York 36, N. Y.

Send me Collings' **Commercial Fertilizers,** 5th Edition, for 10 days' examination on approval. In 10 days, I will remit $8.00, plus few cents delivery, or return book postpaid. (We pay delivery if you remit with this coupon; same return privilege.)

(Print)
Name .....
Street .....
City ..... Zone ..... State .....
Company .....
Position .....

For price and terms outside U.S., write McGraw-Hill Int'l., N.Y.C. CFR-1

FERTILIZER SAFETY SECTION ANNOUNCES COMMITTEE CHAIRMEN

Engineering Committee Chairman
A. B. Pettit, Supervisor Industrial Health and Safety, Davison Chemical Co., Division of W. R. Grace & Co., Baltimore 3, Md.

Engineering Sub-Committees
Statistics and Contest Chairman
F. Wayne High, Manager of Operations, The Baugh Chemical Co., 25 South Calvert St., Baltimore 2, Md.

Data Sheet Chairman
John S. Roszel, Industrial Relations Manager, Olin-Mathieson Chemical Corp., 5500 Pennington Avenue, Baltimore 25, Md.

Pesticide-Fertilizer Mixes Chairman
James P. Hughes, M.D., The Ohio State University, Department of Preventive Medicine, Columbus, O.

Public Relations Chairman
J. Lauren Shopen, Safety Director, Consumer Co-Op Assn. Box 2359, Kansas City, Mo.

Membership And By-Laws Chairman
Mr. Thomas J. Clarke, Controller, G.L.F. Soil Building Service, Terrace Hill, Ithaca, N. Y.

Visual Aids Committee Chairman
E. O. Burroughs, Jr., Manager, Insurance Department, F. S. Royster Guano Co., Norfolk, Va.

Motivation Study Chairman
Roger Hugg, Personnel Supervisor, International Minerals and Chemical Corp., 20 North Wacker Dr., Chicago

Insurance And Legislative Committee Chairman
George L. Pelton, Personnel Manager, The Smith Agricultural Chemical Co., Columbus, O.

Research Committee Chairman
R. G. Diserens, Safety Director, Phillips Chemical Co., Bartlesville, Okla.

Nominating Committee Chairman
Thomas J. Clarke, Controller, G.L.F. Soil Building Service, Terrace Hill, Ithaca, N. Y.

Supervisory Training Committee Chairman
W. C. Creel, Safety Director, State of North Carolina, Department of Labor, Raleigh, N. C.

SOUTHERN STATES PHOSPHATE and FERTILIZER CO.
SAVANNAH, GEORGIA
Manufacturers of SULPHURIC ACID, SUPERPHOSPHATE, COMPLETE FERTILIZERS and ALL TYPES OF BASE GOODS
EXPORT ORDERS SOLICITED

VERMICULITE FINES
(Fertilizer Conditioner)
Truck and Carload Quantities
American Vermiculite Company, Inc.
Phones 2201 & 2301
Roan Mountain, Tennessee

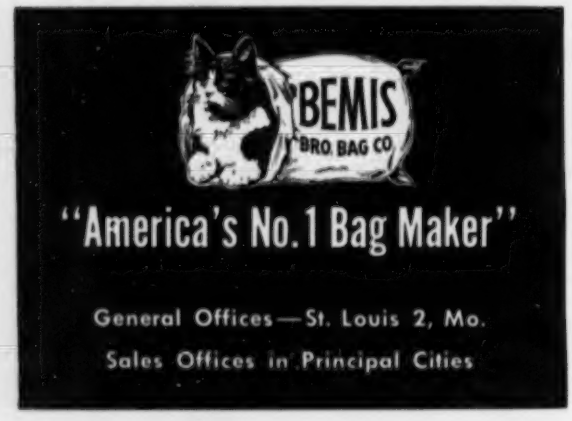
Lancaster, Allwine & Rommel
Registered Patent Attorneys
Suite 428
815—15th STREET, N. W.
Washington 5, D. C.

Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.

LAW & COMPANY
Founded 1903
FERTILIZER CHEMISTS
Three Convenient Laboratories
P. O. Box 1558 Atlanta, (1) Ga. | P. O. Box 789 Montgomery, Ala. | P. O. Box 629 Wilmington, N. C.

SHUEY & COMPANY, INC.
Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemist for National Cottonseed Products Association.
115 E. Bay Street, Savannah, Ga.



Wiley & Company, Inc.
Analytical and Consulting Chemists
Calvert & Read Streets
BALTIMORE 2, MD.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

WANTED NITROGENOUS FERTILIZER (AMMONIUM SULPHATE 20-21% N). Quantity 50/80,000 short tons requested send lowest ship load CIF Karachi prices PMT. Packing required in new Jute Gunny Bags alternatively paper bags break up of the CIF prices should be given. Insurance 10% above CIF cost cover all risks. Box #7, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

WANTED—Working foreman and experienced maintenance man to take charge of fertilizer mixing plant in a Mid-Atlantic state. Box #6, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

FOR SALE: Rotary Dryers 5′ x 30′, 5′ x 40′, 4′6″ x 50′, 5′ x 67′, 6′ x 60′, 9′ x 80′. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

FOR SALE: Equipment in Deepwater, N. J.—Sturtevant 8″ x 10″ Jaw Crusher; Hardinge 6′ dia. x 22″ long Conical Ball Mill; Hardinge Ruggles Coles XC-2 Rotary Steam Tube Dryer 4′ dia. x 30′ long; (2) Link Belt Bucket Elevators 31′ and 32′ high; (4) Jeffrey Suspended type steel feed hoppers 150 cu. ft. and 240 cu. ft., with Howe Scales; (2) Screw Conveyors 9″ dia. x 10′ L and 22′ L; Dracco Automatic Dust Filter Collector with 3 bag filter compartments; (2) Link Belt Bulk-Flo Drag Conveyors size 55-24′ and 34′ long. Will sell all or part. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

BONDED EQUIPMENT BARGAINS: New Conveyor Belting; 4-ply, 28 oz. duck, 1/8″ x 1/32″ rubber covers. 18″, $3.19 foot; 24″, $4.14 foot; 30″, $5.06 foot, Other widths and plies available at bargain prices. 5″ roll diameter Troughing Idlers and Return Rolls. Any width. Priced from $6.75. Vibrating Screens; sizes 2′ x 4′ to 5′ x 14′; 1 to 5 decks. For any screening operation. Priced from $355.00. Large stocks of Screen Cloth. Immediate shipment from our factory. Write for new Catalogs # 1086 and 1087 describing Screens, Catalog # 1119 describing Crushers, List # 1124 of New and Used Equipment. Bonded Scale Company, 111 Kingston, Columbus, Ohio. Phone HI 4-2186.

Serving the

FERTILIZER INDUSTRY

Fertilizer Equipment Sales Corp.

Designers — Engineers — Manufacturers of Fertilizer Machinery

Sales and engineering office:
P. O. Box 1968
130 Krog St., N. E.
Atlanta, Ga.
Phone Cypress 6615

Manufacturing plant:
P. O. Box 67
1610 Kentucky St.
New Orleans, La.
Phone Bywater 8373

SOUTHERN NITROGEN COMPANY

Southern Nitrogen Co., Inc., currently building a $14 million dollar nitrogen plant in Savannah, Georgia, is now putting together its basic organization. Among its personnel needs are:

MANAGER OF DEVELOPMENT

Extensive experience in product development and/or economic evaluation is desired. Technical background in advanced chemistry or chemical engineering with subsequent experience required. Responsibilities will comprise the direction of the Company's technical, market research, and promotional resources in product and/or market development requiring perspective in the chemical industry combined with imagination and energy.

MARKET RESEARCH ANALYST

Two to three years experience in chemical market research preferably of diversified type is desired. Educational background must be in chemical engineering or chemistry. Duties will be to research markets for company's initial products with trend toward product and market development later. Extensive travel will be required.

TECHNICAL SERVICE REPRESENTATIVE

Requirement includes a thorough understanding of the merits of various types of ammoniating solutions based on extensive experience in their application to mixed fertilizers. Experience in the Southeastern section of the U. S. and a degree in Chemistry or chemical engineering are desired. Duties will be to counsel company personnel and customers in the optimum applications of products and the technology of their use, involving extensive travel in a limited geographical area.

SALESMEN

Experience in selling nitrogen products preferably or other fertilizer materials to fertilizer manufacturers in the Southeastern area of the U. S. is required. Salesmen will be expected to become familiar with the technology of ammoniating solution used in mixed fertilizer manufacture. Duties will be to sell the company's nitrogen products to fertilizer manufacturers, requiring extensive travel over a restricted geographical area.

In reply state personal data, education, experience, salary history or requirement. Inquiries will be held confidential if requested.

Address to

Southern Nitrogen Company, Inc.
415 Liberty National Bank Building
Savannah, Georgia

Alex. M. McIver & Son

BROKERS

Specializing

SULPHURIC ACID

Ground Cotton Bur Ash, 38/42% K_2O Potash.

Nitrogenous Materials

Castor Pomace

Urea, 45½% and 46% Nitrogen

DI-N-CAL—20.5% Nitrogen
(Calcium Ammonium Nitrate)

Representatives

Morgan Brothers Bag Company, Inc.

Bags—Paper and Textile

Ammoniated Base and Superphosphate

Dolomitic Lime
(42-44% Magnesium Carbonate)
54-56% Calcium Carbonate)

POTASH

PEOPLES OFFICE BUILDING
Charleston South Carolina
Phones: 3-4828 and 3-4829

Cut Production Costs—

Speed up your plant with
ATLANTA UTILITY
FERTILIZER MACHINERY

Fertilizer Mixing Systems	**Elevators**
Revolving Screens	**Fertilizer Shakers**
Mixing Plows	**Cage Mills**
Clod Breakers	**Batch Mixers**

Write Today for Descriptive Folder

ATLANTA UTILITY WORKS
EAST POINT, GA.

INDEX TO ADVERTISERS

Abrasion and Corrosion Engineering Co. 19
Agricultural Extension Section, United States Steel Corp.
Alabama By-Products Corporation 14
Albemarle Paper Manufacturing Company 13
Allied Chemical & Dye Corporation (Nitrogen Div.) Front Cover, 36-37
American Agricultural Chemical Company, The Inside Front Cover
American Limestone Co. 62
American Potash & Chemical Corporation 34
American Vermiculite Company, Inc. 70
Arkell Safety Bag Company 61
Arkell and Smiths 65
Armour Fertilizer Works 62
Ashcraft-Wilkinson Co. 18, 19
Atkins, Kroll & Company 16
Atlanta Utility Works 72

Bemis Bro. Bag Co. 70
Berkshire Chemicals, Inc. 66
Blaw-Knox (Equipment Division)
Blue Valley Equip. & Engr. Co.
Bradley & Baker (U. S. Phosphoric Products) 23

Chantland Mfg. Company 72
Chase Bag Company
Chicago Fertilizer Co. 67
Cole Manufacturing Co., R. D. 66
Commercial Solvents Corporation

Davidson-Kennedy Co. 63
Deere & Co. (Grand River Chemical Div.)
Doane Agricultural Service, Inc. 66
Duval Sulphur and Potash Co. 18

Equipment Division—Blaw Knox
Escambia Bay Chemical Corp.
Evans Metal Company 62
Exact Weight Scale Company, Inc.

Fertilizer Equipment Sales Corp. 71
Flint Steel Corporation 47
Fulton Bag & Cotton Mills 54

General American Transportation Corporation 12
Grace Chemical Company
Grand River Chemical Division, Deere & Co.

Hammond Bag & Paper Company
Harte Company, John J.
Heugh Co., The Frank G.
Hudson Pulp & Paper Corp. 57

International Minerals & Chemical Corporation
Phosphate Chemicals Division 53
Phosphate Minerals Division
Potash Division 4-5

Johnson Company, C. S.

Ketona Chemical Corporation 14
Koppers Company, Inc. (Tar Products Div.)
Kraft Bag Corporation 17

Lancaster, Allwine & Rommel 70
Law & Company 70
Link-Belt Company 15
Lion Oil Company, A Division of Monsanto Chemical Co. 40

McGraw-Hill Book Co., Inc. 69
McIver & Son, Alex M. 67, 72

National Lime and Stone Co., The 67
Nitroform Agricultural Chemicals Division
Woonsocket Color & Chemical Co. 8
Nitrogen Division (Allied Chemical & Dye Corp.) Front Cover, 36-37

Phelps Dodge Refining Corp. 64
Phillips Chemical Company 45
Potash Company of America Inside Back Cover

Quaker Oats Company, The (Chemicals Dept.) 67

Raymond Bag Company, The 68
Rennebura & Sons Co., Edw.

Sackett and Sons Co., The A. J. 28-29
St. Regis Paper Company, Multiwall Bag Division
Shell Chemical Corporation 41
Shuey & Company, Inc. 70
Simplicity Engineering Company
Smith-Rowland Company 3
Sohio Chemical Co. 11
Southern Lead Burning Co. 67
Southern Nitrogen Company, Inc. 71
Southern States Phosphate and Fertilizer Co. 70
Southern Steel Equip. Co. 69
Spencer Chemical Company
Stedman Foundry & Machine Company, Inc. 55
Sturtevant Mill Company 9

Tennessee Corporation
Texas Gulf Sulphur Co.
Tull Metal & Supply Co., Inc., J. M. 10

Union Bag & Paper Corporation 39
Union Special Machine Co. Back Cover
U. S. Phosphoric Products Division, Tennessee Corp. 23
United States Potash Company, Inc. 49
United States Steel Corp. (Coal Chemical Sales Div.)

Virginia-Carolina Chemical Corporation

Weatherly Company, The D. M. 7
Wiley & Company, Inc. 70
Willingham-Little Stone Company 66
Woodward & Dickerson, Inc.

THE DOWD PRESS, INC., CHARLOTTE, N. C.

GIANT SERVANTS OF AGRICULTURE

A series of continuous mining machines designed, developed and built by PCA's engineers literally tear ore from the earth and automatically pass it onto a panel conveyor for forwarding to the mainline belt.

Such innovations outmode conventional mining practices, increase efficiency, and insure on-time departure of shipments to our customers.

P.C.A.
"The SALT of the EARTH"
RED MURIATE

POTASH COMPANY OF AMERICA

CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

Engineered

to meet modern PRODUCTION REQUIREMENTS

NO two jobs are exactly alike — that's why Union Special builds a wide variety of bag closing equipment. In the Union Special line you will find machines for closing all sizes and kinds of bags from small textile or paper bags of one pound, or less, up to the largest multiwall paper bags in use today. Whether your production schedule calls for closing just a few bags or for high continuous output, Union Special can supply the equipment to do the work efficiently, economically, dependably!

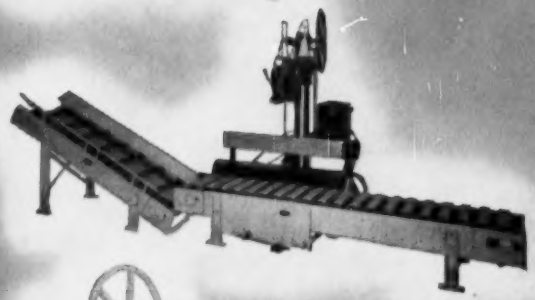
Coupled with a complete line of equipment is Union Special's vast background of experience and technical know-how that insures customers of getting THE RIGHT MACHINE FOR THE JOB!

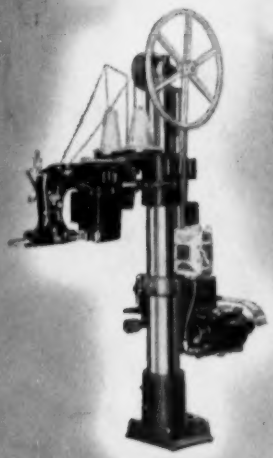
Union Special representatives located in all leading industrial centers are qualified by experience and training to give you expert recommendations. Take advantage of the service they offer.

Ask for recommendations. UNION SPECIAL MACHINE CO., 412 North Franklin St., Chicago 10, Illinois.

Send for Bulletin 200

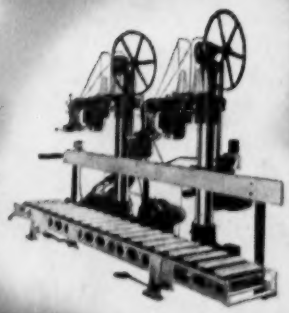
CLASS 21800 *(left)* **for fast, economical closing of paper bags. Illustrated is Style 21800 H with 5 ft. conveyor and 80600 H sewing head for making tape bound closure. Tape is cut off automatically at each end of closure. Sewing head and conveyor adjustable vertically.**





CLASS 20500 *(above)* **machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.**

STYLE 20100 H *(left)*, **is a heavy duty, high production column type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.**



DUPLEX MACHINES *(right)* **are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must — operator can instantly switch to other head.**

Union Special®

BAG CLOSING MACHINES